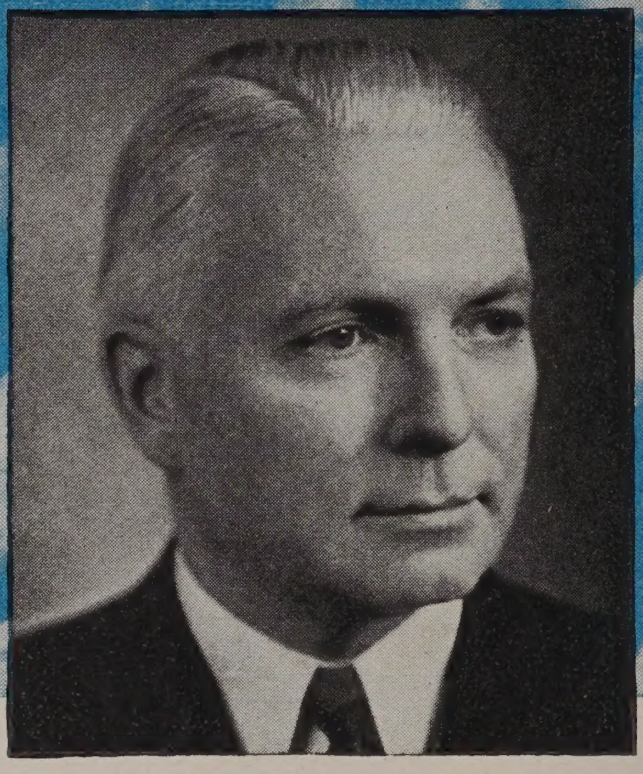
The LEE WAY Poultry Book

A PRACTICAL GUIDE TO POULTRY HEALTH • 1946



Your Poultry Work

This year all of us must put our earnest efforts into the works of Peace—just as for nearly four years we gave ourselves to the necessary works for the saving of our nation.

There is no profession or occupation of greater importance or worth to our Country than that of producing the food which supports the very lives of our people and which is required to save the lives of people in distant lands.

Whether poultry profits are good or whether feed costs are high compared to prices for poultry and eggs, successful poultry raising always comes down to this: the maximum production of eggs or poultry meat from the number of birds fed. That means good stock, good feed, housing and management, careful and persistent culling out of unprofitable birds, control of internal and external parasites, good sanitation, the protection of the health of your flock and proper treatment of sick birds.

This book will help you to success with your poultry. The advice and information are as good as we can give you after more than 50 years of experience and study in the field ot poultry health. Read it once, and then keep it for handy reference.

Donald J. Burke

President, Geo. H. Lee Company

1946

INDEX

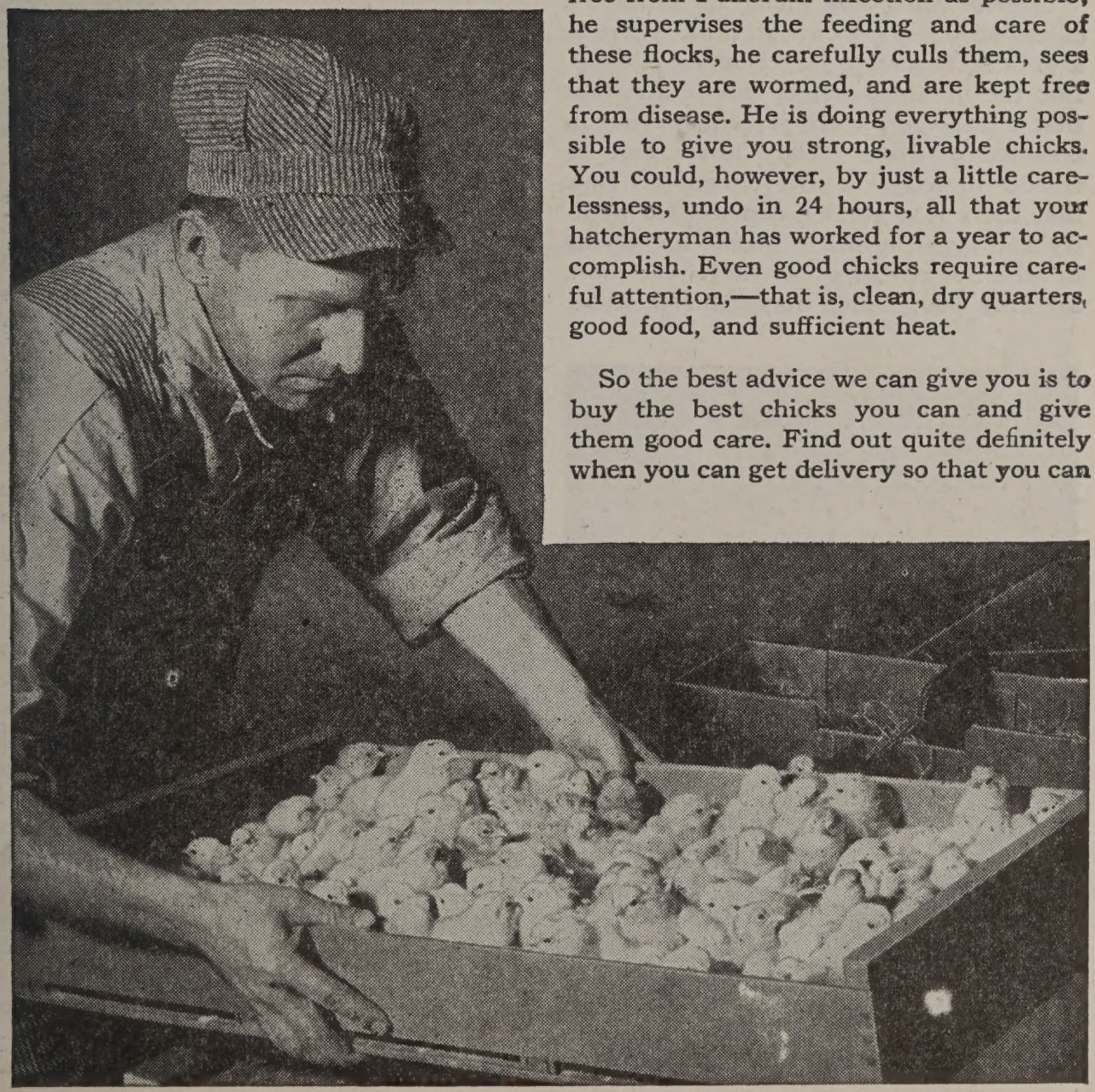
ACIDOX 68-69
ADULT BIRDS, DISEASES OF 38-50
ATAXIA 10
AVIAN DIPHTHERIA (See Pox.) 28
BIG LIVER DISEASE (See Paralysis.) 26
BLINDNESS (See Paralysis.) 25
BLITSPRAY 76
BLOOD SPOTS 38
BLOW OUTS (See Cannibalism.) 41-42
BLUEBUGS 44-45
BOTULISM 39
BRONCHITIS 10, 39-40
BROODER PNEUMONIA 11
BROODING TEMPERATURE 6
BUMBLEFOOT 41
CANKER (See Pox; Mycosis.)
CANNIBALISM 11, 12, 35, 41-42
CHICK DISEASES 10-15
CHICK MANAGEMENT 3-9
CHILLING (See Brooder Pneumonia.) 11
CHOLERA 42-43
COCCIDIOSIS 12, 21-24
COLDS 24, 35, 43
CHICKEN POX 28
CORYZA, SIMPLE 43
DIARRHEAS 12
DIP AND DISINFECTANT, LEE'S 78
DISEASES, POULTRY 10-15, 21-35, 38-50, 51
DRI-RUB, LEE'S 79
DRINKING WATER 6, 20
EGG EATING 43
EPIDEMIC TREMORS 13
EPSOM SALTS (See Laxatives.) 47
EVERSION OF OVIDUCT (See Cannibalism.)
EXTERNAL PARASITES 14, 44-46
FEATHER PULLING (See Cannibalism.) 41
FLEAS 45, 79
FOWL POX 28
GASPING (See Bronchitis; Colds; Laryngotracheitis.)
GERMOZONE 54-60
GIZZARD CAPSULES 61-63
GIZZARD EROSION 13
GREY EYE (See Paralysis.) 25
GROWING BIRDS, DISEASES OF 21-35
HEAD LICE (See External Parasites.) 14
HOG OIL WORMER, LEE'S 78
LAMENESS (See Paralysis; Tuberculosis.) 25
LARYNGOTRACHEITIS 46
LAXATIVES 47
LEE DEALERS 53
LEEMULSION 70, 72
LEUKOSIS (See Paralysis.) 24-27
LEUKEMIA (See Paralysis.) 24-27
LICE 44
LIMBERNECK (See Botulism.) 39
LITTER 5
LOUSE POWDER, LEE'S 74
MITE KILLER, LEE'S 77
MITES (See External Parasites.) 44
MYCOSIS 13-14
OVERCROWDING 4, 17
PARALYSIS 24-27
PARATYPHOID 27
PERCH PAINT, LEE'S 75
PEROSIS 27
PICKPASTE 73
PINJECTOL 73
POX 28-29
PRICE LIST 80
PROLAPSE (See Cannibalism.)
PULLET DISEASE 29
PULLORUM 14, 47
RANGE PARALYSIS (See Paralysis.) 24-27
RED MITES (See External Parasites.) 44
RICKETS 29-30
ROUP, NUTRITIONAL 47
ROUP, OCULAR 48, 58
SANITATION 9
SCALY LEG 48-49
SCOURS IN LIVESTOCK 59
SOD DISEASE 30
SOFT SHELLED EGGS 49
SOREHEAD (See Pox.) 28
STICKTIGHT FLEAS 45
TEMPERATURE, BROODING 6
(See under Chicks Need Teaching, page 6; Bronchitis, 10; Brooder Pneumonia, 11.)
TONAX 64-67
TRICHOMONIASIS 30
TUBERCULOSIS 49-50
TUMORS (See Paralysis.) 26
TURKEYS 58, 62, 73
TYPHOID 50
VAPO-SPRAY 71
WORMS 15, 30-35, 35, 50, 61-63

Care of Chicks

BUYING CHICKS. This is much like buying a pair of shoes; you generally get about what you pay for. If you pay cheap prices, you usually get cheap chicks. The vitality of a chick and its capacity for laying eggs are bred into it. You cannot put those things into it even by good care and good feed; they must be inherited. Ask your hatcheryman about his best grades. He can help you get what is best for your individual needs. If your chicks are of sturdy, good-laying strain, then with good care and feed they should live and make you good profit.

A good chick may cost you a few cents more, but it eats no more and takes no more care than a poor chick. Probably it will require less attention and less medicine. Your chances of raising it are much better, and it will make you more money. The poorest chicks are the most expensive when you consider labor and loss of egg money. Your hatcheryman blood-tests his flocks to give you chicks as nearly free from Pullorum infection as possible; he supervises the feeding and care of these flocks, he carefully culls them, sees that they are wormed, and are kept free from disease. He is doing everything possible to give you strong, livable chicks. You could, however, by just a little carelessness, undo in 24 hours, all that your hatcheryman has worked for a year to accomplish. Even good chicks require careful attention,—that is, clean, dry quarters, good food, and sufficient heat.

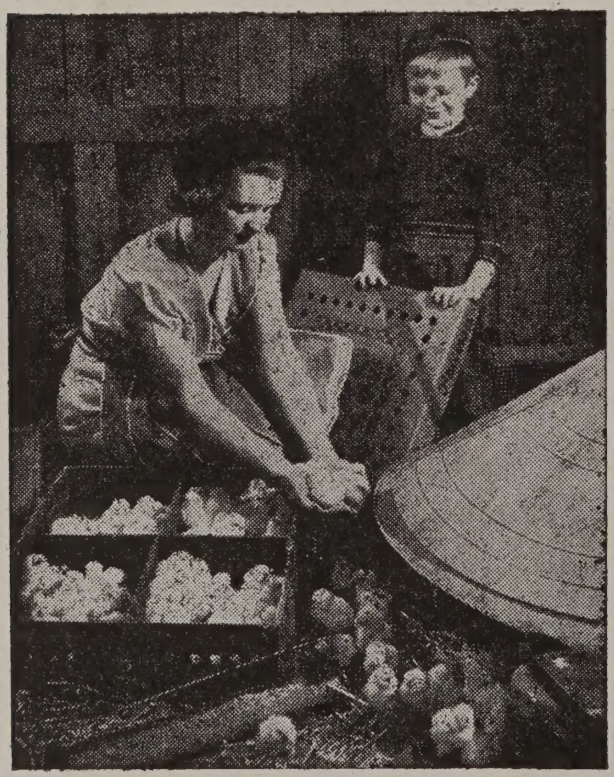
So the best advice we can give you is to buy the best chicks you can and give them good care. Find out quite definitely when you can get delivery so that you can



make proper preparations to care for them before they arrive—not after. Then with good care and management you have a good chance for success.

DON'T OVERCROWD. Attempting to raise more chicks than there is room enough for, has been responsible for more losses than any other one thing in management. Overcrowding always spells trouble. About 35 square feet for each 100 chicks will be found very satisfactory. If your brooder house is say, 10 x 12 feet, you have enough floor space for 300 to 350 chicks. Instead of putting 500 chicks under one canopy hover, you will be more successful if you put from 300 to 350 under it.

Overcrowding has many faults. Some chicks may not get enough heat. There is a greater tendency for them to pile up. But the greatest danger lies in the fact that disease germs are more numerous in crowded quarters. Many losses can be traced directly to overcrowding. Now that there is a greater demand for poultry and eggs too many people are trying to raise 500 chicks where they have room for only 300. Don't make this mistake.



The new home of baby chicks should be clean and comfortable.

Better start 300 and be successful, than to buy 500 and lose 200 of them. If you can provide space so that the chicks can spread out you will have better success.

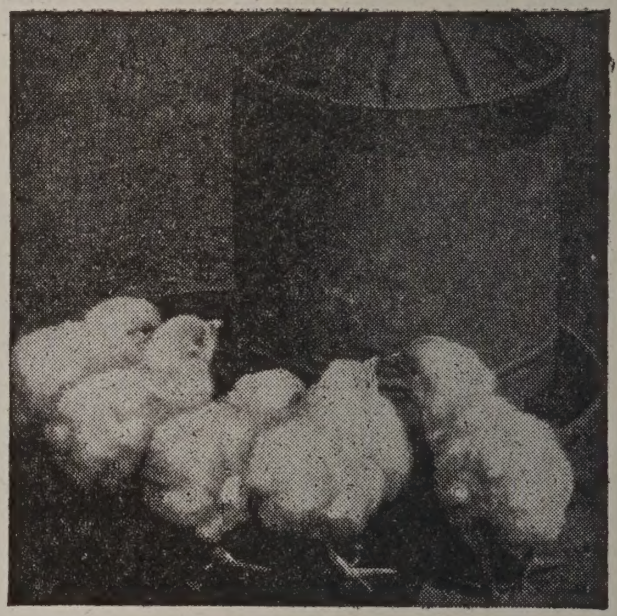
PREPARE IN TIME. Take steps early to insure comfort for your chicks and freedom from parasites. Several days before your chicks arrive, remove everything that you can, like fountains and feed hoppers, to the outside. Then sweep down the dirt and cobwebs from walls and ceilings. Then clean out every bit of old litter and sweep the floors. It's better to take this material far enough away, so that none of your other chickens can come in contact with it, too. After thoroughly disinfecting the brooder house, run the brooder stove to warm up the house so that if there are any mites and vermin they will stir out of their deep hiding places. Then put out the fire and spray the inside walls with either Lee's Mite Killer or Lee's Creosote Dip, either one diluted according to directions. Lee's Mite Killer is high in antiseptic value, and dilution in oil is a dust preventive measure. Get it down into the cracks and crevices where the mites hide. The chief action of the disinfectant depends on its actual contact with the germs. Unless the surface, such as walls and floors, is relatively free from dirt, the disinfectant may not reach the germs beneath that dirt. That is why the use of the hoe, shovel, and broom, and even scrubbing, are so essential before the disinfectant is applied. Otherwise, either much more disinfectant solution must be used, or the job will not be done thoroughly enough to protect the chicks from remaining contamination. You will be well repaid for this work done in cleaning. Let the house air out for a day. Then start the stove and have it warm and dry when you put the litter on the floor. Replace the hoppers and fountains after first giving them a thorough cleaning and disinfecting. During this time be sure to see that the temperature regulation is reasonably accurate. It may be too late to replace faulty wafers or other controls after the chicks are in the brooder.

LITTER. Use a good absorbent litter on the floor at least three inches deep. Dryness, absorption properties, and freedom from dust and mold are the essential qualities of good litter. Dry straw, hay, wood shavings, peat moss, cotton seed waste, cane waste, and ground corn cobs are good. Cheap litter has a decided advantage because it encourages frequent changing.

BROODING TEMPERATURE. Hang your thermometer on the edge of the hover, so that the bulb will be two inches from the floor. At first keep the temperature at 95° F. Drop the temperature very gradually, about 5° per week, for the first three weeks. After that, regulate the stove to suit the chicks; when they crowd, raise the temperature slightly and when they seem to try to escape from the heat, reduce it a little. When the chicks seem contented, the temperature is correct. Sudden outside temperature changes will influence brooding temperature. Therefore close watch should be kept when the weather is changeable. You can lose nearly as many chicks from improper temperature as you can from lack of feed, or water—especially during the first three weeks. So watch your temperature very carefully during that time.

Plenty of hopper space should be provided.

FEED. A good Starting Mash is the safest food for the first six to eight weeks. The cost of this per chick is very small, so the best will be neither too good for your flock nor too expensive for your pocketbook. Milk can be given from the start, but not to take the place of all the water. Either skim-milk or sour milk can be used. After three weeks, both finely cracked grains and any available green stuff can be added to the ration. Growing Mash can replace Starting Mash at six to eight weeks. The change should be made gradually by using a mixture of the two at first. Provide enough hoppers and drinking fountains. Figure on about one inch of hopper space per chick for the first five weeks, and then double that after the fifth week.



Give Germozone in their first drink.

WATER. Water is very important. During cool or cold weather the chill should be taken off water for very young chicks; it should be about lukewarm. Use fresh, clean water, and do not fill the fountains until they have first been thoroughly washed out. After that they should be washed every day. It does not take long for clean water to become contaminated, because there will be particles of food and filth carried into the water on the chicks' beaks. Many disease germs get into the water in this way. Therefore, it is always worth while to add a little Germozone when the fountains are filled, one teaspoonful to the quart of water. (Regarding Germozone, see pages 54 and 55.) During the first week 100 baby chicks will drink approximately 4 quarts of water a day. When they are three weeks old they will drink about 2 gallons, and when they reach 12 weeks of age they will consume an average of 5 gallons a day.

CHICKS NEED TEACHING. Don't just dump chicks in the brooder house and expect them to know what it is all about.

They need to be taught where to get their food and water, and where to get warm. Nature provided the mother hen, and the mother hen is a good teacher. But modern brooding practice has largely displaced her. Don't depend too much on instinct to guide your chicks to water, food and warmth. The sooner healthy eating habits are acquired, the sooner resistance will be built up. Some workers dip the beak of each chick, as it is taken from the box, first into the drinking water and then into the mash. Chicks should also be shown where they can get warm. Push a few of them under the hover at first. The brooding area should be restricted at least for the first six or seven days. Wire netting, circled about three feet around the canopy is often used. Wire, however, does not prevent floor drafts. One of the best methods is to buy some stove-pipe material from your hardware dealer or tinner. Circle this around the canopy of the brooder so that it is about three feet from the edge of the hover all around. Lap the ends over and fasten them together with a couple of clothes pins. If stove-pipe material cannot be obtained, the use of heavy cardboard, or of corrugated paper will serve the purpose very well. When the chicks are a week old, you can take down this screen, and let them have the run of the brooder house. By then you should also have gradually reduced the temperature to 90 degrees.

LIGHT AND FRESH AIR. Light is often an important consideration in poultry management. During the day chicks need enough light to form healthy eating and drinking habits. Difficulty seldom arises in colony brooding. For intensive battery systems, illumination must be sufficient for comfort but not enough to encourage Cannibalism. During the night, subdued light will allow rest and still prevent crowding.

Direct sunlight is the only practical light source of Vitamin D. It should be used as soon and as much as possible. Sunlight passing through glass has little value as a source of Vitamin D, but it is

Keep them healthy and they will keep you.

good for drying the litter and warming up the quarters. Glass substitutes have proved their worth for both chicks and laying flocks.

Fresh air is very necessary for baby chicks. But temperature has nothing to do with freshness. The air must not be cold and the chicks should be protected from drafts. Ventilation of the brooder must be adequate in all cases. Oil burners should be kept in good condition, with provision for carrying off the fumes. Many chicks die from the fumes of the brooder stove when other troubles are blamed.

Chicks should be placed on the ground as soon as weather conditions will permit. Allow them outside about one hour each day for one week. After that time they should remain outside as much as possible. Such a practice allows them to gradually build up a resistance against many infections not met with in the brooder house. Also this is the best way to give the young flock a maximum amount of fresh air without the danger of drafts.

CARE IS IMPORTANT. Of the millions of chicks that die every year, a large part of them die needlessly. Most of the helps that are so important for good success with your chicks, cost you no money—and very little effort. And others, such as a little Germozone in the drinking water or properly disinfecting the brooder room, will save you money when you consider the value of the birds and eggs you might have lost. Thousands who have raised poultry successfully, have found that it does pay to give the chicks those helps. Where Lee Products are advisable, they are recommended in this book. But it also

recommends other common drugs where they can be used to advantage. Where a disease is incurable this book tells you so, and no Lee Remedy is recommended. This book will help you to avoid disease so as to make it unnecessary to treat sick birds. But it tells you how to treat your birds if disease does come. Lee Products are not recommended except where they are of real value.

SANITATION. The ambition of anyone who buys baby chicks is to raise those chicks for a profit. And in order to do that, disease control immediately becomes a most important problem. The best quality chicks you can buy, or the best brooder house, or the best feed possible, will not solve your disease problems. You will still have to reckon with disease germs, because germs are always present in every brooder house, and it is not humanly possible to kill all of them under practical conditions. To a great extent disease can be prevented by being clean with your work. Sanitation is therefore of utmost importance in the care of poultry, whether in the care of baby chicks, or older birds, just as sanitation is important in the everyday life of people. Thorough cleaning and disinfecting the brooder house before putting the chicks in it,—washing the drinking fountains each morning before filling them, changing the litter, should it become too badly soiled or wet, and such things as that, are an essential part of good sanitation.

But, you see, your chicks are living in close contact with one another, they eat from a common feed hopper, drink from the same fountain, and are constantly picking up food particles from the filthy, soiled litter. It is impossible to raise chickens under conditions anywhere nearly so hygienic and sanitary as those under which people live, yet people have disease. And when they do get sick, most of them will go to their doctor and get some medicine.

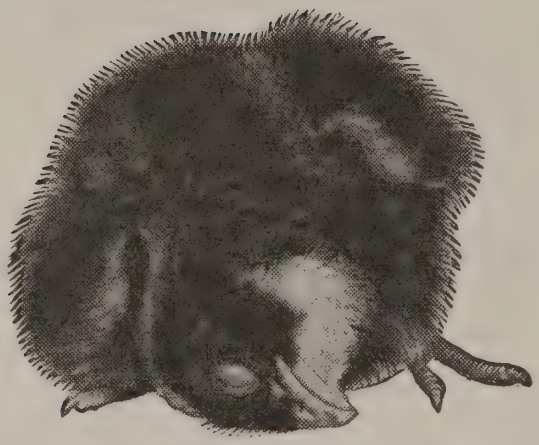
Now when anyone makes the statement that all you poultry raisers need to do is to practice good sanitation, give your chicks good feed and clean water, and that you will then never have any need for medicines, it seems quite possible such men are dreamers, and have never actually raised poultry themselves. Do you think your doctor would tell you that all you had to do would be to practice good sanitation and eat good food, and that then you would never need any medicine? That's not likely! No intelligent person will dispute the advantages of sanitation, but it must be recognized that medication often becomes a part—and an important part—of sanitation.

There is no person living who can keep a brooder house so clean that there aren't countless millions of germs about. And you know your chicks are going to pick in the litter; it's their nature to do it. Some of those germs may cling to the beaks of the chicks, and then when they take a drink at the fountain, some, if not most of the germs are washed off in the water. That is a very common way in which diseases are spread. Therefore, it seems perfectly logical that good medication of the drinking water, which will help in purifying the water, *is* a part of good sanitation. Certainly our city health officials appreciate the importance of treating drinking water. Probably no city fails to chlorinate or in some way to purify its drinking water. The proper medication of the drinking water for chicks is even more necessary.

The dictionary defines sanitation as "the removal, or neutralization of elements injurious to health." Germs certainly are injurious to poultry health, so poultry raisers should be practical about the matter and recognize that *any* means which will reduce or destroy the number of germs which are ever present in any brooder house — whether that means be physical or medicinal—is an essential part of the sanitary program.

Success must be measured by the number of healthy, strong chicks you actually raise. So when starting your chicks this year, it is quite possible you will find the medication of the drinking water of material help. You should not tolerate any halfway measures in your sanitary program.

Chick Diseases



Chick with Ataxia.

ATAXIA. This is often called Crazy Chick Disease. It is not really a disease but is a condition due to failure of the little chick properly to handle certain elements of a feed that may be perfectly balanced and in every way good.

Symptoms. The symptoms are always characteristic. The chick may jerk the head to its side or up over its back, or may twist its neck around until the lower beak is pointing upward as shown in the illustration. The chick may be standing normally, eating at the hopper, and suddenly throw its head over its back and start running backward, or in circles, and possibly fall over. Chicks under three weeks of age are more apt to be affected.

Treatment. No medicinal treatment is necessary. If the trouble appears in more than one or two chicks out of a hundred, add 50% wheat bran to the mash for three or four days, then go back to the same feed. This trouble is not due to the feed whatever.

BRONCHITIS. The term Bronchitis is commonly used by poultrymen and hatcherymen in referring to any condition in young chicks that causes gasping. Often they make no distinction between Colds, Simple Bronchitis, Infectious Bronchitis, and Laryngotracheitis, all of which produce that symptom.

The outward symptoms of all these diseases resemble one another so closely that they cannot be told from one another except by a laboratory examination. This is true even of some Colds although a Cold often shows other symptoms which clearly indicate that it is Cold. There is a great difference, however, between these diseases and the way they respond to treatment. Colds and Simple Bronchitis are the result of germs, while both Infectious Bronchitis and Laryngotracheitis are caused by a specific virus (a disease producing agent that cannot be seen even with a microscope).

Colds seldom cause heavy losses in young chicks unless they are badly neglected. This is also generally true of Laryngotracheitis and Simple Bronchitis. Infectious Bronchitis, however, is more obstinate. It runs a rapid course, usually about 7 or 8 days, and the death loss may run as high as 70% or 80% of the brood. Since Infectious Bronchitis and Laryngotracheitis are both highly contagious, great care should be taken not to infect other chicks or older birds. A good precaution is to tend the well flocks first.

Typical symptom of Bronchitis.

Symptoms. The symptoms of all of these, except Colds, are just about the same. The head and neck are stretched upward or forward and the chick gasps for breath. This gasping is noted with each stretching of the neck. If the chick is held to the ear a rasping, or bubbling sound is heard. Colds may show some gasping, but the gasps are not so frequent. In Colds a

slight watery discharge from the nostrils may be noticed. The eyelids sometimes become glued together, and usually there is a Diarrhea.

Treatment. An increase in temperature is advisable, especially in chicks under three weeks of age. About five degrees is desirable. Use Leemulsion in the mash for chicks under six weeks of age. Directions will be found on the label. Germozone can be used in the drinking water at the same time to help prevent the spread of harmful bacteria. See page 72 for more detailed information regarding the use of Leemulsion.

BROODER PNEUMONIA. This is a broad term and it includes several diseases affecting the lungs of young chicks during the brooding stages. Pneumonia in chicks is sometimes caused by Pullorum infection, sometimes by molds, and sometimes by other germs. The symptoms of Pneumonia may vary. One thing invariably to be noticed is that the affected chick will seek heat and chirps much of the time. It is relatively quiet and one can see at a glance that it is sick. Some cases show severe Diarrheas. Others show signs of Colds.

For all practical purposes we can assume that the Pneumonia producing organisms are always present. All they require to produce Pneumonia is a lowered resistance. And lowered resistance is likely to result from chilling, overheating or drafts.

It is impossible to say definitely just what amounts to chilling. Should the fire in the brooder stove go out, and the chicks be subjected to sudden, or drastic change in temperature, chilling followed by heavy losses can naturally be expected. On the other hand there are many cases where chicks die as the result of chilling although the temperature is normal. These cases generally result from floor drafts, which are caused by too much cold air intake in the brooder house. Chicks need fresh air, but they cannot stand even the slightest draft. It should also be remembered that overheating is even worse than chilling and will cause the same symptoms. It may therefore be seen that special care should be given to the matter of temperature, and to any draft on the floor.

Symptoms that result from chilling, overheating or drafts and which usually accompany Pneumonia, include Colds and Diarrheas. The symptoms do not appear for several days after the damage has been done. Colds can be told by a discharge about the nostrils and, possibly, by "sticky" eyes. Diarrheas are most frequent, and they are easily diagnosed too as the discharge adheres to the fluff about the vent.

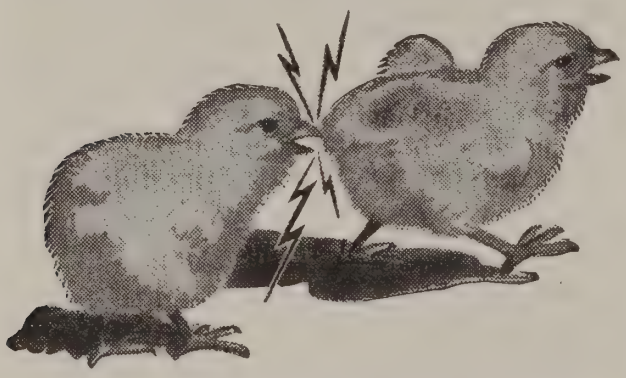
Pneumonia causes the small lungs to become so engorged with blood that they cannot hold sufficient air, and the chick is in danger of suffocating. In these cases if a postmortem examination is made the lungs are found to be dark in color, and they may be so heavy that they will sink in water.

Treatment. The first thing to do in all such cases is to stop any floor drafts and increase the temperature. If the chicks are under two weeks of age raise the temperature to 90 degrees. See that the litter is clean and free from any dampness. Use Leemulsion immediately, mixed in the mash, or in the drinking water. For chicks showing bowel trouble, Germozone in the drinking water is of value. Leemulsion can be given in the drinking water during the forenoon, and Germozone in the afternoon. Feed lightly for a few days. More complete directions for treatment will be found on page 72.

CANNIBALISM. This is a habit, not a disease. Out of curiosity chicks often pick one another's toes, wings, tail or vent. They may cause slight wounds; because they like the taste of blood they get the habit and it quickly grows so that within a short time most of the flock will be picking one another.

Treatment. In earlier stages, before the habit has become too fixed, Pickpaste may be used to good advantage. Apply it on the backs or wings of about one-fourth of the birds so that those that pick will get a taste of the blood colored paste which they mistake for blood. The taste is repulsive to birds and usually will soon

break them of the habit. Supply sufficient hopper space so that all can feed at the same time without being overcrowded. The treatment should be started at the first sign of picking because, like any habit, the longer indulged in the more difficult it is to be overcome.



There is evidence that lack of fiber in the diet may promote Cannibalism. Oats form a readily obtainable supplement to supply fiber. Whole, crimped, or clipped oats can be fed up to 25% of the total ration. For chicks under five weeks of age, ground whole oats can be used.

A litter that is fibrous is also helpful. This can be either peat moss or any kind of good straw, wood shavings, cane, or ground corn cobs. Overcrowding encourages Cannibalism, and makes it harder to stop. Chicks eight weeks of age should have at least one square foot for each chick in daytime quarters and twice this area of range. See Cannibalism, pages 41 and 42.

COCCIDIOSIS. Only a few cases of this disease in chicks under three weeks of age have been reported. Coccidiosis is so rare below that age that it need not be expected. Good sanitation is usually practiced for the first two or three weeks, and then it takes from 4 to 7 days after the chick picks up the parasite, before it comes down with the disease. That is the principal reason why Coccidiosis seldom occurs in chicks under three weeks of age.

Often a postmortem on a baby chick will show "cheesy plugs" in the ceca, or blind pouches at the lower end of the intestines. Often they are found in chicks only 4 or 5 days of age. These plugs are sometimes taken for evidence of Coccidiosis. They are nothing but a collection of dead cells which have sloughed off of the lining of the intestines and have collected in the ceca, and they do not indicate Coccidiosis. A number of different kinds of infection, as well as chilling or overheating, may have something to do with the formation of such "plugs".

The danger of Coccidiosis is greatest between the ages of 3 and 10 weeks. Then it appears as an acute infection. That is the time when greatest care should be taken to guard against this disease. Complete information on this subject will be found on pages 21-24.

COLDS. See Bronchitis, page 10, and Brooder Pneumonia, page 11.

DIARRHEAS. One of the most common troubles in chicks is Simple Diarrheas. They can generally be prevented by reasonable precautions, and they usually respond well to right treatment. They are not of infectious origin; that is they are not caused by some specific organism. For the common infectious Diarrheas see: Coccidiosis, Pullorum, Cholera and Typhoid. The simple Diarrheas are often caused by chilling, overheating, moldy or musty feed, improper feeding, or by drafts. In Simple Diarrheas the intestines are irritated and these local irritations furnish breeding places for different kinds of bacteria, many of which produce dangerous toxins or poisons. In that way, too, and by wearing down the natural resistance of the chicks, Simple Diarrheas often pave the way for more serious diseases.

Prevention. Germozone is excellent. Besides being a soothing and effective astringent, Germozone exercises a very beneficial action against many harmful bacteria that may be present in the irritated intestines. It helps to hold them in check. Germozone should be given to baby chicks in their first drink (one teaspoonful to the quart of water) and continued in that proportion until they are three weeks old. After that, and as long as the chicks are well, you may use Germozone only in the water that is used to fill the fountains in the morning. For Growing Birds see page 56. See that the chicks are not overcrowded and that good feed is supplied. Ample room, proper feed, clean-

liness and the regular use of Germozone will do much to avoid Simple Diarrheas. Additional heat, sufficient to maintain comfort, is often necessary.

EPIDEMIC TREMORS. This is a relatively new problem which has arisen in the poultry field during the past ten years. Even today it is not well understood, but it is believed to be caused by what is known as a virus; that is, by a substance too small to be seen even by a microscope and, therefore, too small to be identified. It attacks chicks between a few days and five weeks of age, and sometimes causes a loss of as many as 50% of them. The chicks that recover seem to recover completely but it is suspected that they may be carriers of the virus. This disease has never been observed in adult birds.

Symptoms. This disease can be recognized by a rapid vibration or trembling of the head. This is especially noticeable if the bird is handled or if there is any unusual noise or other disturbance. The symptom is not noticeable when the bird is asleep or at rest. If head vibrations alone are present, the bird has little difficulty in eating or drinking, but sometimes there is a dizziness along with these tremors, and then it is quite difficult for the chick to eat.

Treatment. Since the cause of this disease is not definitely known, no specific treatment can be recommended as a cure. But any time any kind of infection is suspected, whether it be a virus infection or not, it is always advisable to clean and disinfect the brooder house with a good reliable disinfectant; also all fountains and hoppers. Then use what precautions you can to prevent the spread of infection through the water. Germozone in the drinking water is advisable. And the addition of Tonax (1 pound to each 100 pounds of mash) will be of help in building up the resistance of the birds.

GIZZARD EROSION. In recent years a condition, called Gizzard Erosion, has received considerable attention and has caused serious losses. This trouble occurs in young chicks, from one day to four weeks of age. It affects the lining of the gizzard. Frequently the trouble causes very heavy losses. Whenever many chicks under four weeks of age are being lost, the gizzards of some that die should be inspected. If spots that appear like sores or ulcers are found, the flock should be treated for Gizzard Erosion.

Cause. The gizzard requires an Anti-gizzard-erosion Factor to do its work without breaking down. This is a food element which is first derived from the egg. But the egg seldom furnishes enough of it, and about 85% of all chicks come from the egg with slightly pitted gizzard linings. Normally the deficiency is soon made up without serious losses. Under crowded conditions the chicks are less likely to overcome the deficiency.

Treatment. We do not have enough data on which to base advice on how to prevent Gizzard Erosion. The Anti-gizzard-erosion Factor is formed from bile, and the bile is formed from blood by the liver. Ground whole oats appear to be the most practical means for furnishing the required Anti-gizzard-erosion Factor. Therefore feed a mash containing 25% of ground whole oats until the condition has cleared up. Add 1% of Tonax to the mash. Tonax itself does not supply that factor and therefore is not a cure. But Tonax is of value in building up the resistance of the affected chicks until they can acquire a sufficient supply of the necessary Anti-gizzard-erosion Factor.

True Mycosis can easily be mistaken for Gizzard Erosion. Therefore if the chicks do not show improvement within 10 days you should suspect that the trouble may be Mycosis, and then treat for that. See title, Mycosis, below.

LARYNGOTRACHEITIS. See Bronchitis, page 10, and Laryngotracheitis, page 46.

MYCOSIS. This is a name given to a condition which sometimes affects the lining membranes of the mouth, crop, stomach, or gizzard, and less frequently even the first part of the intestines. It is caused by a specific mold. There are many, many kinds of molds. Most of them are friendly to humans, animals and poultry. For in-

stance, yeast, used in baking bread, the molds contained in cheeses, and many other molds are not only harmless, but are actually beneficial. There are a few, like the ones causing Athlete's Foot, "Lumpy Jaw" in cattle, and this one, which do cause harm. This particular one that produces Mycosis sometimes causes considerable loss. It is often confused with Gizzard Erosion. Gizzard Erosion is the more common of the two, but it has often been improperly diagnosed as Mycosis. See Gizzard Erosion, page 13.

Symptoms. They vary a good bit. In the more severe cases a discharge from the mouth is noticed; there is a loss of appetite, the bird becomes weak, and soon a greenish Diarrhea develops.

Postmortem. If the mouth or throat are affected, grayish, or whitish patches will be found on the membranes. These are distinguished from Pox cankers by the ease with which they are removed. If the crop is affected, a dirty, grayish-white substance will be found on its lining. This gives the crop a thickened appearance. It looks as if the lining lay in folds, and it has crinkles like crimped decorating paper. This substance can be easily removed by scraping with the thumb-nail.

Sometimes the glandular stomach (which lies between the crop and gizzard) shows considerable swelling, and possibly some ulcer-like spots on its lining. The gizzard is more often affected. In less severe cases there appear to be fissures, or craters in its lining membrane. In the more severe cases even ulcers in the lining will be observed. Some of these may extend clear through the lining and into the muscle. A section, and sometimes almost all of the lining may be loosened, and underneath this lining, there may be a grayish substance like that appearing in the crop. The intestines rarely are affected, and when they are it is only the part next to the gizzard. It may show a slightly swollen, or thickened condition.

Treatment. Clean houses, clean litter, clean fountains, and clean feed should be given first consideration. In other words remove the cause of this mold just as well as you can. Around the hoppers, where the birds have billed out some of the feed, is a place where the molds are likely to form. Also around the fountains, because dampness helps molds to grow.

To one quart of Acidox add one ounce of powdered Copper Sulphate, and shake until dissolved. Of this mixture use one tablespoonful to each gallon of drinking water, and give every other day until five treatments have been given. This treatment cannot be used in galvanized fountains, because of the Copper Sulphate. It should be given in glass or earthenware. If any grayish, or white patches are noticed in the mouth or throat, remove them with a small pair of tweezers and paint with undiluted Germozone.

PARASITES (EXTERNAL). If directions for the preparation of the brooder (see Page 4) are followed, there will be little danger of lice or mite infestation with chicks. Occasionally lice may gain a foothold. They can be eliminated in several ways, but keep in mind that chicks can be injured by insecticides entirely harmless to older stock. Body lice can best be treated with Lee's Louse Powder, using a pinch method. As much powder as can be pinched between the thumb and index finger can be placed on the back and under the vent of each chick. Do this in the morning—never late in the afternoon or evening.

For body lice and head lice, a chick ointment can be used. Make a smooth paste of one level tablespoonful of Lee's Mite Killer or Blitspray and two heaping tablespoonfuls of powdered sulphur. Stir into three heaping tablespoonfuls of vaseline or cup grease. Apply lightly in the morning on the head of chicks for head lice, or under the wings and vent for body lice. This ointment can be used freely on mature birds. Follow directions carefully.

PARATYPHOID. See Paratyphoid, page 27.

PEROSIS. See Perosis, page 27.

PULLORUM. This is a highly infectious disease in young chicks between 1 day and 3 weeks of age. It is really a blood poisoning. The germ causing Pullorum belongs to a family composed of a large group of

germs, some of which may cause the same symptoms. Pullorum can therefore be diagnosed with accuracy only by a laboratory examination.

Chick affected with lung form of Pullorum Disease.

Symptoms. The external symptoms are much like those of a number of other diseases. The chicks will huddle together, and generally seek heat under the brooder. They have a drowsy, sleepy appearance and chirp much of the time. Usually there is no Diarrhea. When there is, it is of a whitish, or brownish appearance. It has a tendency to cling on the fluff about the vent, and within a short time a plug of this accumulated material may completely cover the vent. That is, the chicks may become "pasted up". In cases where the lungs are affected, breathing becomes rapid, and the chick has a "balled" appearance.

Postmortem. The liver is usually a light yellowish, or ochre color. An unabsorbed egg yolk is generally found. When the lungs are affected, small yellowish or whitish spots about the size of a millet seed will be found on the surface of the lung which lies next to the ribs. The heart may show small bumps or small swollen spots on its surface. These bumps have a grayish appearance.

Treatment. Pullorum is incurable. However early care can do much to build up the natural resistance of the chicks to a point where they are less likely to die of the infection. They will not make good layers, and it is advisable not to carry them beyond the broiler age. Cleanliness is one of the most important things. This should include frequent disinfection of drinking fountains, hoppers, and floors. The litter should be changed often because an affected chick will pass many Pullorum germs in its droppings. Sufficient heat is also necessary, even a few degrees higher than what would be normal for chicks at that age, but never more than 95 degrees.

Often by good care and management severe losses from Pullorum may be avoided. See Pullorum, page 47.

RICKETS. See Rickets, pages 29-30.

WORMS. Worms are generally not common enough in young chicks under six weeks of age to cause much concern.

The greatest danger comes after the chicks are turned outdoors. From then on, and during the entire life of the birds, worms are a menace. Round Worms are usually first to develop because there are few farms that do not have large numbers of round worm eggs on the ground or in the buildings. So as soon as the chicks are turned outside there is a strong probability that they will pick up some of these worm eggs.

Round Worms are not so difficult to control if measures are started early. Once young birds have been allowed to become filled with Round Worms, it requires a heavy dose of medicine to remove them. Young birds that have even occasional contact with older birds often show heavy worm infestation. The same is true for chicks allowed to range on ground recently occupied by an older flock. Along with sanitation, Tonax used in the mash at the rate of one pound to each 100 pounds of mash will help to reduce infestation. An ample feeding program will do much to keep down heavy worm infestation.

Care of Growing Birds

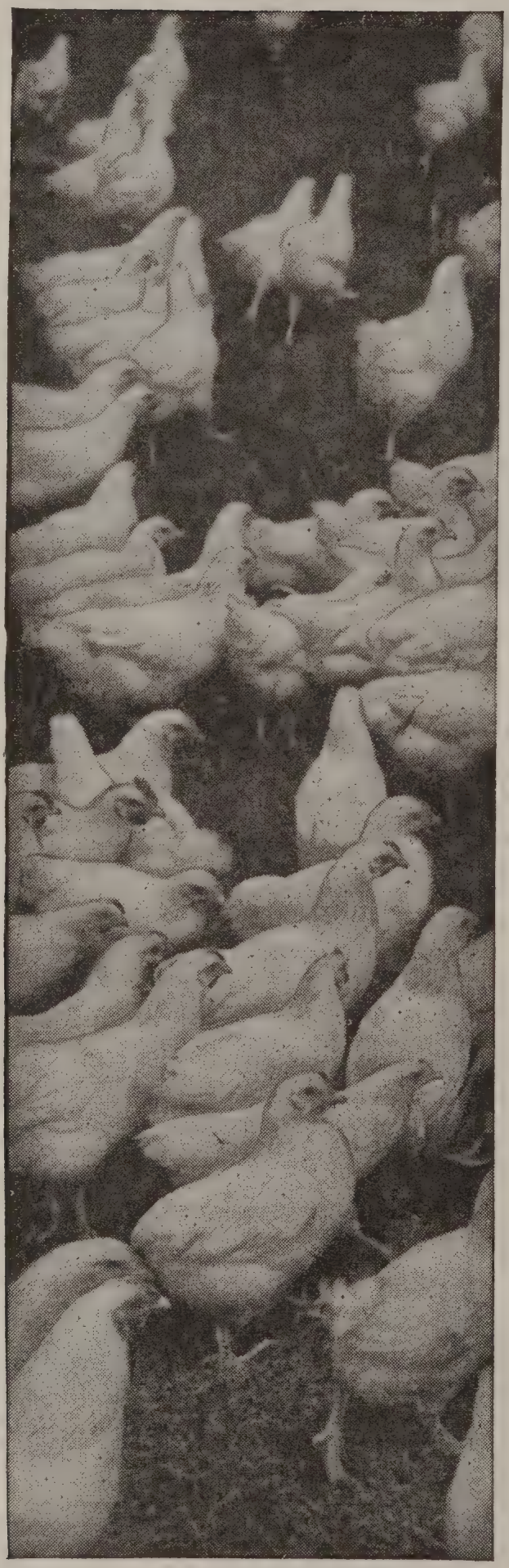
The most critical time of a bird's life is between the fourth week and the fourth month. That is the developing, or growing period. A good chick can be ruined as a profitable pullet during this time by neglect. Many people take the best of care of their chicks until they reach the age of four or five weeks, and then let them rustle for themselves until September.

True, the young flock has now passed the "chick danger zone". However they will have to meet dangers much more costly than those met during the chick stage. The loss of a few chicks under three weeks of age is only the loss of the small cost of the chicks plus a negligible amount of feed and labor, but to lose birds two, three, or four months of age is a much greater loss. But this is the time when we generally get lax, due to the press of other work, and sanitation is either forgotten or practiced only carelessly. Later, when losses begin to occur as the result of Coccidiosis, Paralysis, Colds, Typhoid, or worms, we just can't understand it; we never had a flock that did better, and here, all at once, they start to die and it looks as if we might probably lose all of them.

The truth is, all of these troubles can be traced directly to neglect, with the exception of Paralysis. We have let the flock range on ground that contains worm eggs or coccidia, or we have let them roost in a damp or drafty building, or we have let then run with the old flock. We should always bear in mind that sanitation means seeing that the birds have fit and favorable conditions to live under, and keeping the premises as free from germs, worm eggs, and other infections as we can.

Overcrowding is one condition that is very common and very costly. Usually the poultry raiser has taken care to provide enough room for the young chicks. But chicks grow, and when they become twice as big they need three times as much room. Too often they have no more room than they had when they were baby chicks.

Overcrowding is likely to bring on



Colds. And it makes just about all communicable diseases more likely because the young birds are in close contact with one another, and because overcrowding reduces resistance and greatly increases the concentration of filth and disease germs.

There is a big difference in resistance between chickens, just as in people. Some have a higher natural resistance against disease than others do. For instance, in an outbreak of Colds some become quite badly affected, yet others show no signs of it. The same is true even in an outbreak of Cholera; some of the birds die, others may become quite sick for a few days but recover, while still others will go through the attack without showing the least sign of infection.

We can do much to help our flock avoid disease. Two things must be done for this. One is to keep disease germs down below the disease level. The other thing is to build up the resistance of the birds so that they can successfully combat such disease germs as do attack them. Remember, two things that do much toward tearing down resistance are intestinal worms and intestinal irritations. But Lice and Mites, overcrowding, and poor housing conditions also lower resistance. To help avoid intestinal irritations, Germozone is advisable. The regular use of Germozone once a day in the drinking water, and the addition of 1% of Tonax to the mash, will be found to be a good program to follow throughout the growing period. (See pages 56 and 67.)

Thousands of poultrymen use Germozone regularly for the first few weeks and know its value. But as soon as the chicks are put out of doors some of them take no further precautions. This is unfortunate. Germozone is just as valuable for growing stock and for old flocks as it is for young chicks. Germozone should be used regularly as a part of the sanitary program—for chicks, growing stock, and adult birds.

However, medicines cannot take the place of good sanitation, good management, and good feed. They cannot perform miracles, but they can, and do help nature to help herself. No sanitary pro-

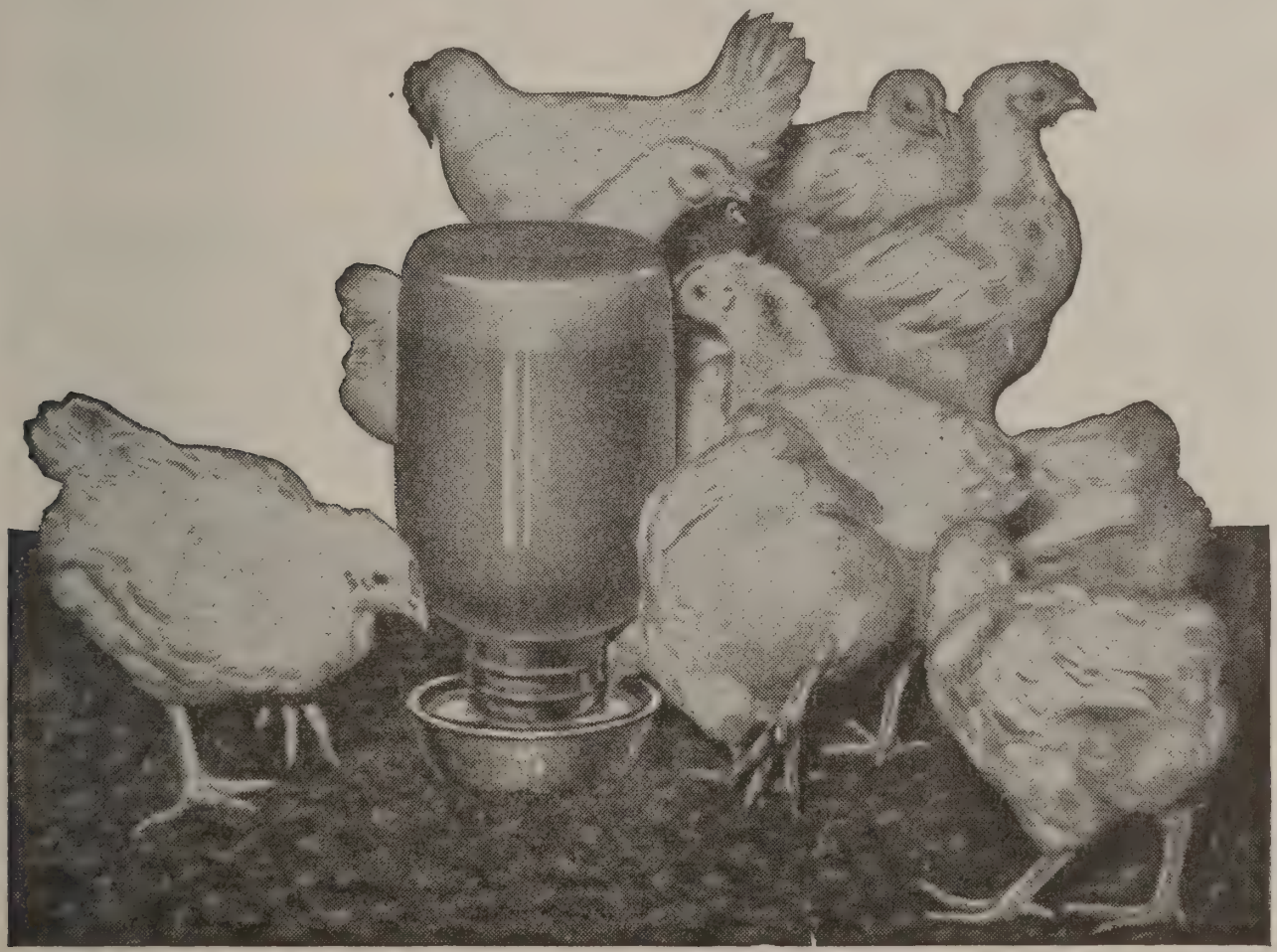
gram has ever been worked out to keep chicks or older birds from picking up some germs. If relatively few germs are taken in daily, the bird's system can satisfactorily overcome them. But if more germs are picked up than nature can take care of, the bird becomes sick.

The practice of cleanliness is therefore of utmost importance. However, in spite of all you can do to keep the premises clean, chickens will often get the drinking water quite badly polluted within a short time. They do this by carrying filth particles on their beaks which are washed off in the drinking water. Germozone will usually take care of the germs in the water. And when the Germozone water is drunk, it may destroy many germs which it reaches in the crop. Also, it has a very important action against disease germs even back in the intestines. But if the floors and runs are allowed to become filthy, the birds are likely to pick up more germs than both nature and Germozone together can handle. That is why we say that medicines cannot do away with the necessity for cleanliness.

The problem of culling should not be disregarded during the growing period. At the age of eight to ten weeks, two or three chicks out of each hundred will often show lack of normal growth. These runts may be less than half the size and weight of normal birds. At three months they will have passed a peak of growth capacity that will never return. Such birds will never show a profit, and the sensible thing is to get rid of them. They waste feed, often take up space needed by the others, and are in general a nuisance to the poultry raiser.

While raising straight run chicks presents no great difficulty in management in normal times, under present conditions of feed scarcity it is important to adjust the program of rearing to get the most out of cockerels for the least feed. It is always well to separate the roosters from the pullets as soon as sex can be determined. This is generally easy in the case of Leghorns, and more difficult for heavy breeds.

Accurate separation is seldom required. The object is to protect the smaller birds



from the ones that develop strength and size more rapidly. Hence it is sufficient to take out the cockerels from time to time when they can be distinguished as such. By the end of the third month, all of them will be separated so that they can be finished for market.

It has been a common practice to allow pullets to develop normally. Access to ample range, green if possible, with no forcing diet, has proved helpful in building sturdy pullets. Other methods may get the flock into the lay somewhat earlier, but the birds seem less able to stand the strain of continued high production.

With cockerels, the situation is quite different. Too many males are fed between the ages of four and six months at an actual loss to the poultryman during that period. It is a good rule to get Leghorn males on the market at three months of age, and heavier breed cockerels at four months of age. This means the use of limited range, with a diet formulated to aid rapid growth. In other words, the average poultryman can get more out of his male birds if he uses some of the tactics found valuable by the broiler raiser.

There are exceptions of course to the above procedure. Breeders will handle male birds with the same purposeful care as his pullets. Some poultrymen like to raise a few capons, and a limited group have found larger scale capon raising profitable. In general, keeping cockerels for roasters at six to eight months of age is unprofitable, especially when ample culls from the pullet flock will be available at that age.

The following table of feed and water requirements will be found useful in flock planning.

APPROXIMATE FEED AND WATER CONSUMPTION OF EACH 100 CHICKS

Age in weeks	*Feed per 100 chicks per week* LIGHT BREEDS	HEAVY BREEDS	*Daily Water Consumption*
1	8 lbs.	8 lbs.	4 qts.
2	17 lbs.	18 lbs.	2 gal.
3	24 lbs.	25 lbs.	2 gal.
4	38 lbs.	42 lbs.	2 gal.
6	53 lbs.	60 lbs.	3 gal.
8	76 lbs.	85 lbs.	3 gal.
10	92 lbs.	103 lbs.	4 gal.
12	98 lbs.	105 lbs.	5 gal.

A healthy, vigorous growing flock is the pride of every poultryman.

Diseases of Growing Birds

A typical advanced case of Coccidiosis.

BLOW-OUTS. See Cannibalism, page 41.

CANNIBALISM. See Cannibalism, pages 11 and 12 and page 41.

COCCIDIOSIS. This is one of the most common and most serious of chicken diseases. At one time it was believed that Coccidiosis affected only young birds between three and ten weeks of age, but now it is probably just as common in laying pullets and it frequently occurs in adult birds. Many fowls that show little or no signs of the disease, pass out large numbers of the parasites that cause Coccidiosis, in their droppings. There are few farms or poultry yards in the Nation which do not have some of these parasites in the soil, especially near the buildings or in them.

The parasites that cause Coccidiosis are called coccidia. They are too small to be seen without a microscope and they are extremely hard to kill. They can live in the ground from one year to another if there is a little moisture. Moisture is necessary for them, and that is why Coccidiosis is more common in wet years.

There are several different kinds of coccidia. Some kinds attack the lining of the intestines while other kinds do their damage in the ceca, or blind pouches at the lower end of the intestines. But for practical purposes, we can divide Coccidiosis into two kinds, an intestinal form and a cecal form sometimes called "Bloody Coccidiosis."

Symptoms. The cecal kind makes its appearance quite suddenly, sometimes al-

most overnight. It affects young birds between 3 and 10 weeks of age. Generally the first ones to die are not the weakest or smallest birds as might be supposed, but the largest and best ones. It kills quickly, and frequently a large proportion of the young birds are lost during the first few days. Of course within a short time nearly all of the flock will be affected, unless very prompt and effective steps are taken. There is a sleepy appearance, the wings hang, the birds seem not to want to move about, and they seek warmth. Frequently, but not always, there is blood in the droppings.

Pullets and older birds usually get only the intestinal form of Coccidiosis. It is sometimes called "Chronic Coccidiosis". Here we see a different picture. No large numbers of birds die within a few days but some of the pullets begin to develop a mild Diarrhea, they don't care to move about very much, and their appetite gets poor. After a few days they begin to lose weight and, unless prompt measures are taken, a considerable number of them will die.

Postmortem. If Coccidiosis is suspected, it is always advisable to open and examine any bird that dies. In the younger chicks of 3 to 10 weeks of age, first examine the ceca, or blind pouches at the lower end of the intestines. If it is the cecal form you will find one or both of these ceca enlarged, and usually filled with blood, or a hard, cheesy plug. If this is not found, carefully examine the entire intestines for a thickened condition of the intestinal wall, or for red or white spots on the lining.

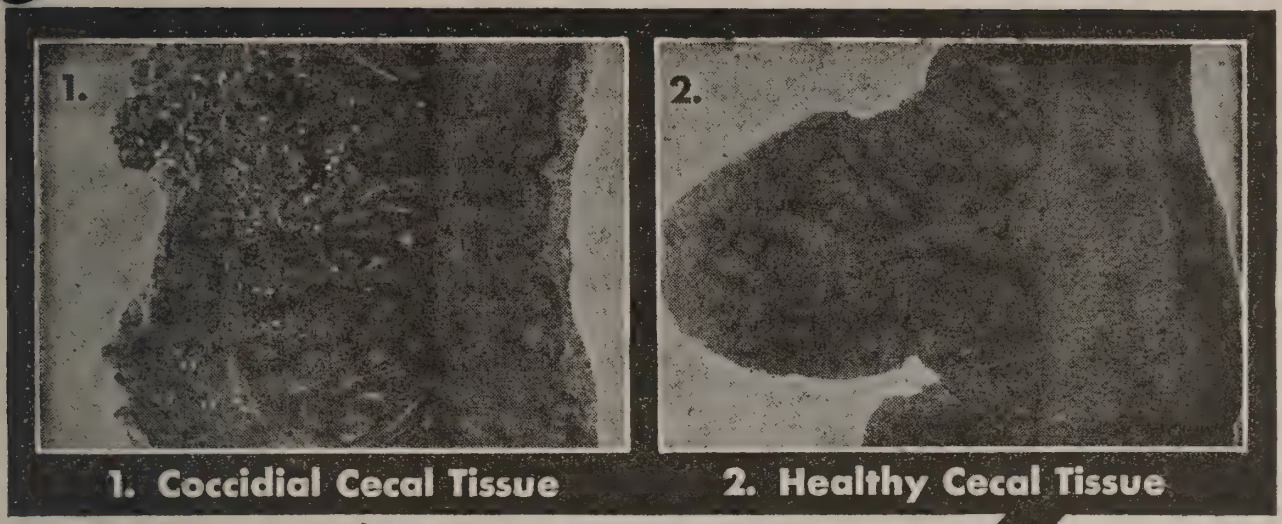
In pullets the ceca are rarely affected, but when their intestines are split open considerable mucus is generally found, and the wall of the intestines is swollen, or thickened. Sometimes red or white spots can be seen on the lining, or inside surface of the intestines, and the white spots may even be seen through the intestines before they are opened.

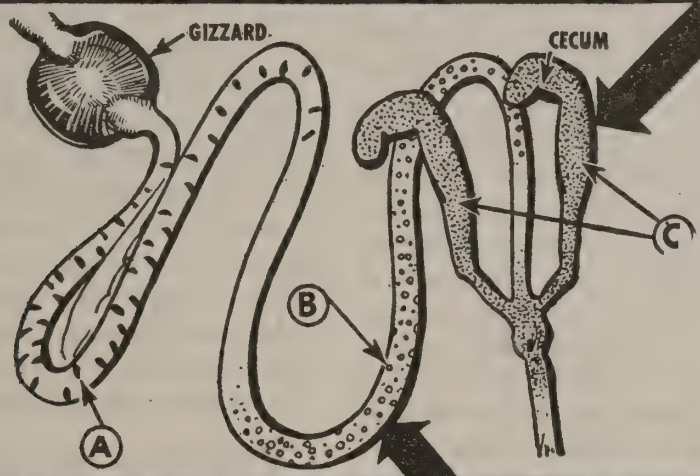
Prevention. It is better to do all you can to prevent any severe outbreak of Coccidiosis, than to have to fight the disease. A number of things should always be done. First, see that the brooder house is properly cleaned and disinfected, and that the floors have a good amount of litter on them. Do this before the chicks come. Sand does not make a good litter; use one which will take up the moisture. Wheat straw is good but needs to be changed more frequently than some others such as peat moss, sugar cane by-products, ground corn-cobs, and several others on the market. The main thing is to keep the litter as dry as possible. A deep litter, stirred often with a fork, is important and can generally be used until the chicks are large enough to go outdoors. Second, be sure the chicks are not overcrowded, and that there are enough feed hoppers and fountains. Change these to different places each day, to avoid wet spots. Third, do not try to brood chicks of different ages together; nine times out of ten it doesn't work. Fourth, see that the temperature is sufficient so that the chicks are comfortable at all times.

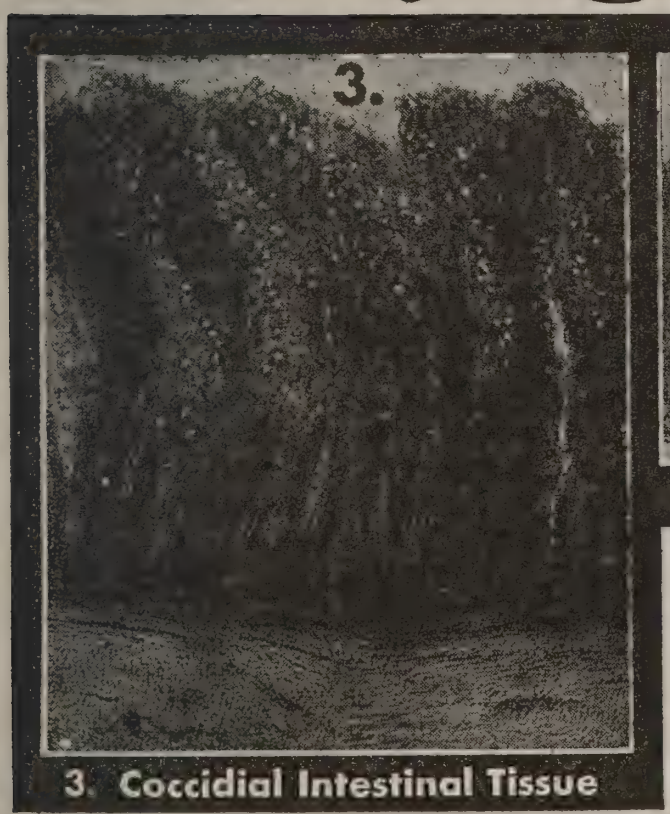
When the flock is put outdoors, keep them away from older birds. You have probably noticed that very often your chicks do fine as long as they are in the brooder house, but that when they get outside it is not long until they come down with Coccidiosis. Since a bird with chronic Coccidiosis passes out thousands of coccidia in its droppings every day, you can realize that it is very dangerous to let young chicks run with older birds or to leave them on ground badly contaminated by older birds.

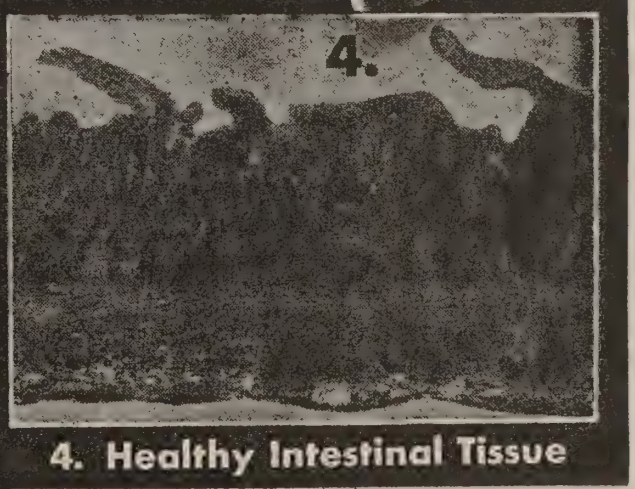
There is one thing, however, in your favor. Chicks can build up an immunity against Coccidiosis, provided they do not pick up the coccidia in too large numbers. If you had the disease in your flock last year, you can assume that plenty of live coccidia still remain on the premises. It is a good plan to allow all chicks, when they are two or three weeks of age, and if the weather permits, to get out on the ground, but only for one hour a day for the first week. After that, the time outdoors should be gradually lengthened. That allows the chicks to pick up a few coccidia each day, but usually not enough to cause the disease. They therefore gradually vaccinate themselves. It is only where chicks are al-

(Continued on page 24)









These Lee Laboratory photographs were taken through a microscope and show cross-sections of tissue. They are of the same magnification. Figs. 1 and 2 show the comparison between a cecum damaged by Coccidiosis and a normal one. Note the thickened and damaged lining in Fig. 1. Fig. 3 shows how badly Coccidiosis damages the lining of the intestines, while Fig. 4 shows the wall of a normal intestine. The lining in Fig. 3 is almost 3 times as thick as normal. The drawing of the intestinal tract shows the three places (marked A, B and C) where Coccidiosis commonly attacks.

lowed to pick up coccidia in great numbers that Coccidiosis develops. That is why the first birds to die of Coccidiosis are often the largest and best ones. They were the most active birds and they picked up more coccidia than the less active ones.

What to do for symptoms. If sanitation has been good throughout the brooding period, the external symptoms may be limited to pale combs and sleepiness in some birds of the flock at nine or ten weeks of age. Whether the outbreak is mild or severe, you can do a lot to keep down losses. Sanitation should be intensified if necessary, but the chief problem is to keep the birds eating and drinking so that they can restore damaged tissue. A good feeding program should not be upset nor harsh chemicals used in the drinking water. Both of these pitfalls can be avoided by simply using Acidox and Germozone in the drinking water on alternate days. You can give these medicines in any kind of drinking fount. The full program is outlined on pages 68 and 69. Thousands of poultrymen follow it every year. They know that although there is no "cure" for Coccidiosis they can do something about it.

COLDS. Often colds in growing birds are both troublesome and costly. Sometimes they occur during the hottest months of the Summer. Hot days and cool nights, especially when the temperature changes suddenly, are likely to cause a Cold. Drafty houses, overcrowding, and wet, rainy weather also are likely to bring on Colds. However, even under conditions that seem to be ideal, sometimes Colds are quite a problem during the growing period. Those cases often result from a rundown condition of the birds, and the rundown condition often is the result of worms, lice, mites, or Coccidiosis.

Any evidence of Colds should always be regarded as serious and prompt treatment should be started. Try to locate the cause, and correct it. Unless such Colds are relieved, they are likely to result in Roup. Colds often cause not only considerable death loss, but also stunted birds.

For more complete information on Colds, and for their treatment, see page 43.

EVERSION OF OVIDUCT. See Cannibalism, page 41.

EXTERNAL PARASITES. See, under Chick Management, page 4; also, External Parasites, pages 44-46.

LEUKEMIA. See Paralysis, below.

MYCOSIS. See Mycosis, pages 13-14.

PARALYSIS. This trouble is known by many names. It has been called Leucosis, Range Paralysis, Big Liver Disease, Leukemia, Grey Eye, and Neurolymphomatosis. These names refer more to the symptoms which you are likely to see rather than to the disease itself. For instance Grey Eye is the term often used by some poultrymen to describe that form of the disease in which the eye changes from its normal color to a grey, and finally becomes blind. The bird seems normal in every respect except for the blindness. The name Range Paralysis was commonly used because so many birds became paralyzed while they were on range.

Paralysis is a very complex disease. Every poultryman should learn as much as he can about it because Paralysis is one of the most common poultry troubles, and its losses run into millions of dollars annually. Not many birds become affected at one time; possibly only one or two each week, out of a flock of 100 or 150. When the losses are considered over only two or three weeks they do not amount to much, but when they are figured over a year or more they run very high. The greatest losses occur between the ages of 3 months and 1 year although older and younger birds are sometimes affected. During the past fifteen years this disease has put thousands of poultrymen out of business.

No one knows just what causes this trouble. The majority of poultry experts believe that it is due to a virus, which is a disease organism too small to be seen even with a microscope. If they are correct, the virus has a very long incubation period; that is, it apparently takes two or three months after the virus gets into the bird's system before the disease shows up. It is not known just how the virus is spread from one bird to another. It is

Leg form of Paralysis.

possible that it is gotten by the chick from the egg and, if so, Paralysis is an inherited disease. There is some evidence that seems to indicate that it can be spread from one bird to another by contact. Because so little is known about the disease it is advisable always to separate any affected birds from the rest of the flock as quickly as their condition is noticed, on the theory that it may be an infectious disease.

Symptoms. There are five forms, or types of Paralysis, and each will be described separately. The first and most common form, is a paralysis which affects one or both of the legs or wings. If it is a leg the bird goes down on its breast or side with one leg stretched forward, and the other backward. If it is a wing, the wing drops very noticeably. The bird's appetite remains good even after it is down and, except for its inability to stand, the bird seems perfectly normal. On postmortem examination the nerves that run to the affected leg or wing will be found to be enlarged quite a bit.

Form of Paralysis affecting eye, called "Grey Eye."

The second form affects only the eyes, one or both. The color of the eyes, which is normal for that breed, gradually changes to a grey. The eyes look like what is called "glass eyes" in horses. When this change takes place the bird becomes blind.

The third form is very rare. In it the bones, especially those of the legs, become greatly thickened. This form of Paralysis is so rare that it is not of much economic importance.

All of these three forms can easily be diagnosed by the poultryman. He can suspect Paralysis when a bird becomes paralyzed, or when the eyes of one or two birds become glassy and grey, or when any of the bones appear to be greatly thickened.

The fourth and fifth forms cannot be diagnosed except by means of a postmortem examination. In the fourth form the liver may be 4 or 5 times its normal size.

Liver form of Paralysis
Liver Several Times Normal Size.

Poultrymen often call this form "Big Liver Disease". In the fifth form there are tumor-like masses which affect any one or other of the internal organs, especially the ovaries.

Enlarged nerve leading to paralyzed leg.

In the three forms that affect the liver, the bones and the internal organs, there is a marked change in the blood. However, this can be told only by a laboratory examination.

Resistance. The resistance of a flock to the development of the supposed Paralysis virus is important. All progress that has been made has resulted from building up or making use of the birds' resistance. The exact nature of protection, or resistance to the disease, is not known. Many facts seem to indicate that it is hereditary and, therefore, does not come from contact with the disease organism. For example, in a flock of mixed Leghorn, Rock, and Wyandotte pullets running together, Paralysis may cause loss in any one of the breeds and not in the other two. And by saving the pullets from the affected breed for a year, after carefully culling out all of those with any symptoms of Paralysis, you can get from the ones that are kept, offspring which will show high resistance to Paralysis.

Besides breeding, sanitation plays an important part in building up resistance. Natural resistance may not come from exposure to the disease, and too much exposure may break down a bird's resistance. For this reason, growing chickens should not be allowed to run with older stock. Good general sanitation should be practiced, and measures should be taken to avoid damage from coccidia, lice, mites, and worms. All of these things tend to break down the natural resistance.

Treatment. There is no cure for developed cases of Paralysis, and it is not practical or profitable to try to treat affected birds. Instead, make every effort to avoid continued losses. Cull all birds showing any external symptoms of Paralysis and those that lack vigor. Treat for Coccidiosis (see pages 21-24 and 68), Worms (see pages 30-35 and 61), and Lice (see pages 44-46 and 74), if necessary. Tonics are not cures but a good tonic offers more help than other medicines. Give Tonax (page 64) in the mash for one week at the rate of 2 pounds to each 100 pounds of mash, thoroughly mixed. Then continue the use of 1 pound of Tonax to 100 pounds of mash. This is to help build up the nat-

ural resistance of the unaffected birds. Success is measured not by the prevention of all loss, but by the general health of the birds you keep and by their production.

PARATYPHOID. This name is given to a disease condition which affects chickens, especially young chicks and growing birds; and also turkey poults, ducks, geese, and pigeons. It is caused by any of a group of germs in a large family of germs. To that same family also belongs the germ that causes Fowl Typhoid and the one that causes Pullorum Disease.

Symptoms. At times Paratyphoid causes considerable losses in baby chicks and older birds. In young chicks the symptoms and postmortem findings are the same as those of Pullorum Disease. (See Pullorum Disease, page 15). When this disease occurs in older birds there is a general unthriftiness, the appetite is poor, and a diarrhea develops. On postmortem the intestines are found to be inflamed and to contain a thick mucus.

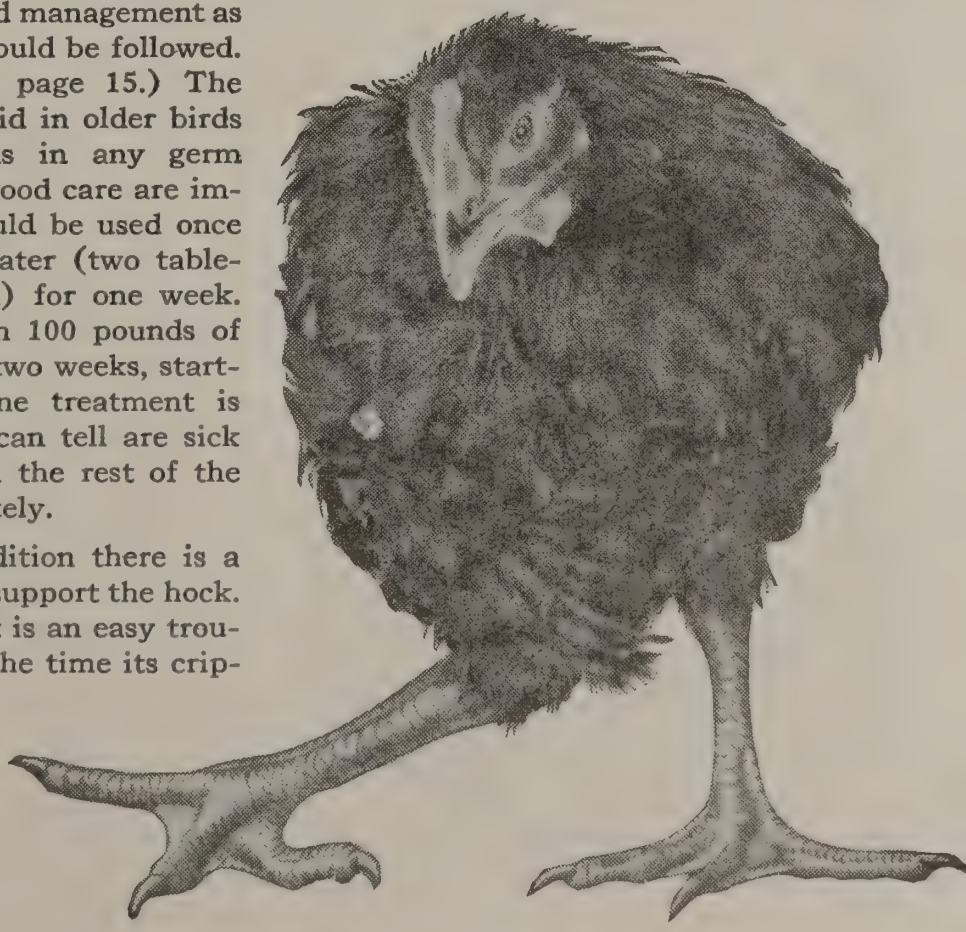
Treatment. There is no satisfactory treatment for Paratyphoid in young chicks. The same care and management as for Pullorum Disease, should be followed. (See Pullorum Disease, page 15.) The treatment for Paratyphoid in older birds is more satisfactory. As in any germ disease, cleanliness and good care are important. Germozone should be used once a day in the drinking water (two tablespoonfuls to each gallon) for one week. Tonax, 2 pounds to each 100 pounds of mash, should be fed for two weeks, starting when the Germozone treatment is started. Birds that you can tell are sick should be removed from the rest of the flock and treated separately.

PEROSIS. In this condition there is a slipping of tendons that support the hock. (See picture at right.) It is an easy trouble to diagnose, but by the time its crippling effect is noticed it is too late to do anything about it. Chicks with Perosis will often develop well in spite of the lameness.

Cause. Lack of sufficient Manganese in the ration is the chief cause of Perosis. Rapid growth has something to do with it too, and therefore battery broiler raisers suffer heaviest loss from it. Nevertheless, it may appear in any flock on a diet too low in Manganese. Another substance, Choline, is necessary in the ration to prevent Perosis. There is some Choline in the bile and brain of animals, in fish meal and in egg yolk. But not enough is known about the amount of Choline in different poultry feeds to give directions for fortifying the ration with Choline.

Manganese is easily supplied. Four ounces of Manganese sulphate to each ton of feed is ample. Germozone in the drinking water and Tonax in the mash will help prevent Perosis.

Bird affected with Perosis.



Severe case of Fowl Pox.

POX. This disease is called by several different names: Chicken Pox, Fowl Pox, Avian Diphtheria or Sorehead. Pox is a highly infectious disease, and it breaks out in all parts of the world where chickens are raised. It is more frequent during the Fall and Winter months, and therefore it affects pullets more than younger birds.

There are two forms of Pox. One form, the skin type, affects the unfeathered parts of the body, especially the comb and wattles. The first sign of this form of the disease will be small, raised, grayish blister-like spots. They gradually grow larger and turn into brownish-black scabs. In the milder cases there may be only a few scabs. But there are often many scabs on the comb, face, and wattles, in the more severe cases. The scabs become very dry and hard. Within two to four weeks they drop off and leave whitish, or grayish spots which gradually become normal in color.

The other form, the Diphtheritic form (sometimes called the canker type), affects the throat and mouth. In this form of the disease, raised yellowish cankers form in the mouth or throat. Sometimes the cankers become so large that the bird cannot close its mouth. Occasionally, they form at the opening into the windpipe. Then they seriously interfere with breathing, and sometimes even choke the bird to death.

In many outbreaks of Pox some birds will have both the skin form and the canker form. In addition, their eyes may become inflamed. Then there is a watery discharge, or a yellowish cheesy mass may form in either eye. This causes the eye to bulge and gives it a swollen, or puffy appearance.

Chicks under six weeks of age get only the Diphtheritic form of Pox. When they do get it, cankers form in the mouth, especially at the corners. Often they become so large that the chick is unable to

eat. Pox is not so common in young chicks, but when it does attack them the losses are often very high.

In pullets and older birds, Pox is always serious. The skin form may cause only few deaths, if any, but it seriously hurts egg production. An outbreak in the Fall may cut down egg production all through the Winter. The canker form is even more serious and often causes rather heavy death loss besides the loss in production.

Prevention. Pox can be almost completely prevented by vaccination. The surest way is to use the chicken strain of vaccine, and to vaccinate during the growing period. Usually the best time to vaccinate is when the birds are about 8 to 10 weeks of age. Do not vaccinate pullet flocks about ready to lay, or just starting to lay. In such cases vaccination may be more costly than the disease itself.

Treatment. Once Pox has become well started in a flock, it is difficult to treat. If it is the canker form, remove the cankers with a small pair of tweezers and then paint the sores with undiluted Germozone. In the same way, pick off scabs on the comb and wattles and paint those sores with full strength Germozone. Do all you can to keep the birds comfortable and to build up their strength. Two things are of value in building up their resistance. First, add two pounds of Tonax to each one hundred pounds of mash and feed this mash mixture for three weeks. (About Tonax, see page 64.) Second, give Germozone, two tablespoonfuls to each gallon of drinking water, every other day for the same three-week period. (See pages 54 and 56 regarding Germozone and how it acts.)

PROLAPSE. See Cannibalism, page 41.

"PULLET DISEASE". A trouble which is commonly called Pullet Disease sometimes occurs, usually during the late Summer and in birds from 4 to 7 months of age. The chief external symptoms are wilted, or blue combs, sunken eyes, and shrivelled feet. Diarrhea may be present. The trouble often comes on quite suddenly and, on an average, probably about 20% of a flock is affected. The average death loss is likely to run about 5%.

On postmortem examination, the intestines appear to be slightly irritated, and they contain a bit of mucus. The pancreas (which lies in the fold of intestines immediately back of the gizzard) has a chalky color, instead of being pinkish-grey. Also, the kidneys may be enlarged.

Treatment. Good results have been reported from feeding a wet mash, consisting of 50 parts of ground whole oats, 50 parts of bran, 10 parts of molasses, and 5 parts of water. This can be given every other morning until the birds have received four treatments.

See Paralysis, page 24.

RICKETS. This is a condition in which there is a defective formation of bones. It is found in all kinds of warm blooded animals. In chickens, the thigh bone is a good one for examination when the disease is suspected. In six week birds an attack of Rickets may appear very much like an outbreak of Coccidiosis. The older the chicks, the more weight the leg bones must bear. This makes diagnosis easier because lameness is noticeable. On postmortem, if the upper end of the thigh bone is pulled from its socket, the end is likely to be found to be spongy and can often be crushed easily between the fingers. The lower ends of the ribs are easily bent, and the beak has a rubbery feeling and bends easily.

Chick affected with Rickets.

Causes. For the body to make use of calcium in the formation of bones, a sufficient amount of Vitamin D is essential. Lack of Vitamin D is the commonest cause of Rickets. Since birds exposed to sunlight three to four hours each day can manufacture sufficient Vitamin D, Rickets will rarely occur in such flocks unless there is a lack of calcium.

Treatment. There should be in the mash 2% of a mineral containing calcium. Two pounds of limestone, gypsum, or crushed oyster shell to every hundred pounds of mash will supply sufficient calcium. Commercial mashes nearly always contain a sufficient amount of this essential mineral.

Extra Vitamin D can be supplied by adding Poultry Cod Liver Oil to the mash. It is better mixed fresh every two or three weeks. Add 1 pint of the oil to 10 pounds of mash and mix thoroughly by hand. Then mix that by shovel with 90 pounds of mash. This gives a 1% mixture and is sufficient where the mash already contains cod liver oil. For mashes made at home, 2% cod liver oil (2 pints to each 100 pounds of mash) can be used if necessary.

A reliable feed dealer should be consulted for any nutritional troubles and on any question about feeding.

SOD DISEASE. This is a disease that usually affects only young chicks, but it sometimes causes trouble in older birds too. In some attacks the death loss may be quite high, unless proper control steps are taken. This trouble first made its appearance in the Middle Western States in chicks which were ranging on prairie land, on sod. That is why it was given the name of Sod Disease. It has now spread to other sections of the Country, and it has become a real problem. It is found more frequently during the early Summer months. Sod Disease is now believed to be caused by some of the pus producing germs.

Symptoms. Watery-like blisters form on or between the toes. Scabs soon replace these blisters, and the bird becomes lame. Its feet may become so sore that it cannot stand. In some cases the toes may slough off entirely and in other cases that recover, the toes may be badly drawn, or deformed.

Treatment. Put the flock on plowed, or spaded ground. For those birds which are affected, soak the feet for one minute in a solution of two tablespoonfuls of Germozone to one quart of warm water.

TRICHOMONIASIS. This is a disease which may affect all or any part of the digestive tract. It is caused by a single-celled parasite similar to that which causes Blackhead in turkeys, but usually Trichomoniasis is not so destructive as Blackhead. It attacks birds of any age, but more frequently during the growing period and during hot Summer months.

Symptoms. The symptoms closely resemble those of Coccidiosis: sleepiness, droopiness, a brownish or yellowish diarrhea which is often foamy, and rapid loss of weight.

Postmortem. On first opening the bird, you will notice a paleness of the internal organs. The ceca, or blind pouches at the lower end of the intestines, have a "ballooned" appearance. Split them open and you will find that they contain a brownish or yellowish, foamy material. In advanced cases there is a catarrhal condition in the organs that are affected, such as the crop, intestines, and ceca. That is, they are coated with mucus, and there may be peculiar cheesy formations of dead tissue found on them.

Treatment. The same precautions as those described for Coccidiosis should be observed. The Acidox-Germozone treatment which is so successful in Coccidiosis, will be found equally effective in treating Trichomoniasis. See page 68.

TUMORS. See Paralysis (fifth form of the disease), page 25.

WORMS. You cannot always tell by looking over your flock whether they have worms or not. Often if a bird that appears to be in good condition is killed and its intestines are split open, large numbers of worms may be found. Worms often go unnoticed in a flock until they have done a great deal of harm.

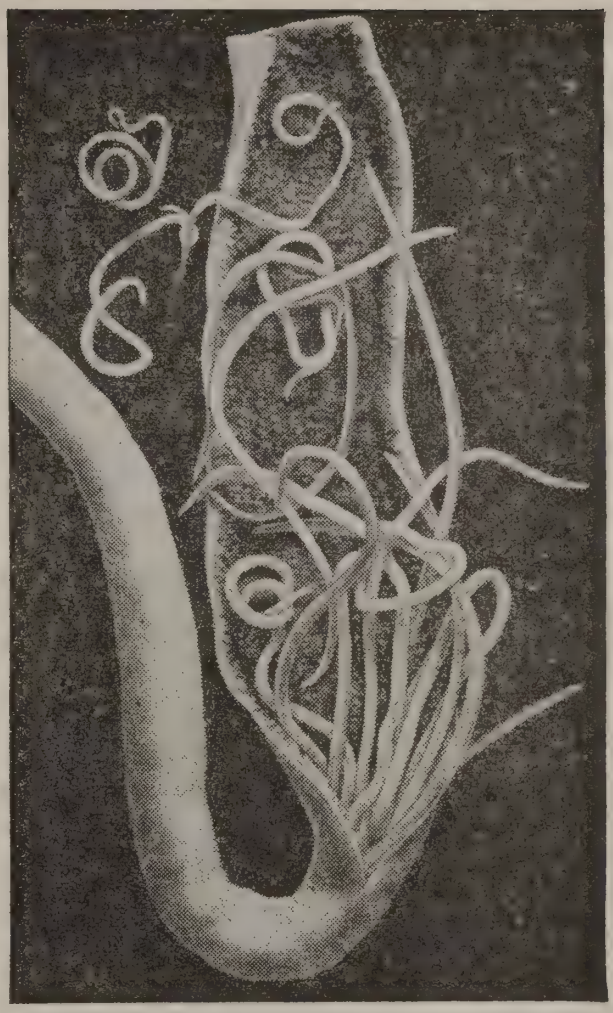
It is very rare to find worms in chicks under six weeks of age. But after chicks

reach that age worms become a real danger for the whole life of the birds. Poultry frequently become quite heavily infested with worms even when the birds are on ground that is thought to be free of worm eggs. Even those reared in batteries sometimes become infested with Tape Worms.

At just what age poultry is hurt the most by worms it is hard to say. Many poultrymen think that the growing age is the most critical period of a bird's life. There can be no doubt but what worms do cause a great amount of damage during that period. It is not often that worms actually kill a chicken. Their greatest damage is done by robbing the bird of feed. This makes it lose weight. The breast bone becomes sharp, and the head parts turn pale. Worms very often keep young birds from developing and putting on weight as they should. Also, they often cause considerable irritation to the lining of the intestines. The irritated parts of the intestines are good places for germs to develop and multiply. All of these things naturally lower the resistance of a bird and make her less able to resist any disease germs that she may pick up or breathe in. Therefore, you can be sure that worms frequently keep promising young birds from becoming good pullets.

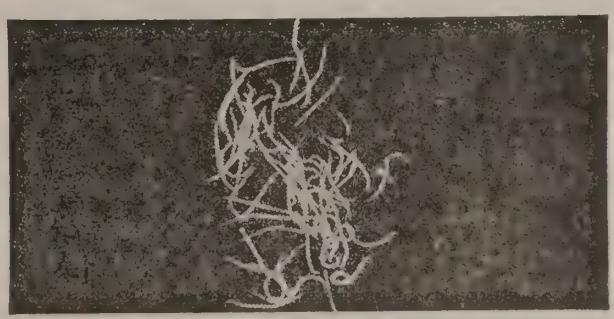
Worms in laying flocks may not cause so much loss of weight as they do in growing birds, but they do very seriously cut down egg production. And, as in growing birds, the natural resistance of a laying flock is lowered by worms.

There are three common kinds of poultry worms. The most common one is the Large Round Worm. This worm generally varies in length from one-half to 3 inches. It is a slender, wiry worm, pointed at both ends, and of a creamy color. Round Worms are found, usually, in the middle portion of the bird's intestines. The female Round Worm lays her eggs there. She may lay as many as 15,000 eggs at one time. The worm eggs are then carried out in the bird's droppings. When they are freshly passed they are not harmful to a bird that may pick up some of them. But after they have been incubated by being exposed to warmth and moisture on the ground for 10 to 16 days, they will infest birds that pick them up. Within 50 to 60 days from the time the female worm lays her eggs, another generation including thousands of female Round Worms can become fully developed and be laying fertile eggs.



Intestine partly split open showing common large Round Worms.

Another common species of worms in poultry is the Pin Worm (Small Round Worm). Pin Worms are very small. They are shaped like the Large Round Worms,



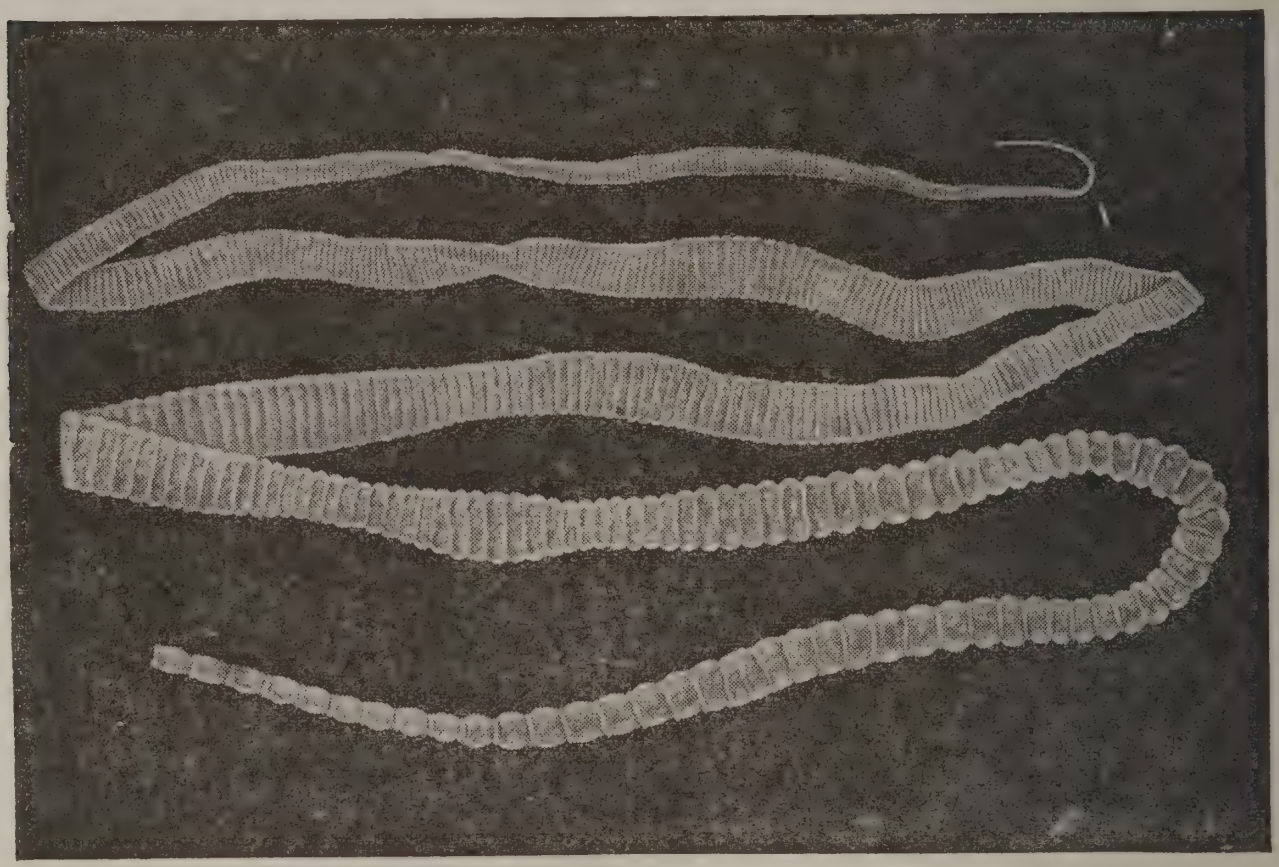
A collection of Pin Worms taken from ceca.

pointed at both ends, and are of the same color. Their body is not as thick as a sewing needle, and they grow to be only about a quarter of an inch in length.

Pin Worms develop in the same way as the Large Round Worms; that is, the females lay eggs that are passed out in the bird's droppings. After the worm eggs incubate on the ground, they will infest birds that pick them up. Pin Worms are found only in the ceca, or blind pouches that branch off from the lower part of the intestines. They are found in the tip, or blind end of the ceca. It is not definitely known just how much damage Pin Worms do. The organism that causes Blackhead is carried in Pin Worm eggs. In that way Pin Worms are the most common means of spreading Blackhead in chickens and turkeys. And it is very probable that Pin Worms themselves, like Large Round Worms, do serious damage to the birds.

Poultry Tape Worms differ in all respects from Round Worms and Pin Worms. In the first place, there are nine different kinds of Tape Worms which a chicken may have. They vary greatly in size. Some are so small they can scarcely be seen. Others run 1, 4, 6, 12 or even 16 inches in length. The extremely small kind is found in the loop of the intestines immediately back of the gizzard. The farther back in the intestines Tape Worms exist, the larger they grow.

All Tape Worms have heads equipped with small hooks and suckers. The head is so small it cannot be examined unless it is magnified. Back of the head of the larger species of tapes is a fine, threadlike neck, and behind the neck are a number of joints, called segments. The small kind of Tape Worms either have a very short neck or no neck at all and their chain of segments starts immediately back of the head. The "body" of a Tape Worm really consists of a chain of segments. They look somewhat like a string of pearl beads, and they increase in number as the worm grows in length.



Large Tape Worm. Note smallness of head at end upper right.

The end, or tail segments of a Tape Worm contain eggs. The number of eggs varies in the different species of worms. Some tape segments contain as many as 200 eggs, while those of another species

may contain only 8 or 10 eggs. When the tail segments become full of eggs, they drop off from the body of the Tape Worm, and are carried out in the droppings of the chicken. These "egg" segments are called "gravid", or "ripe" segments. For several hours after the gravid segments have been passed, they can be seen to stretch themselves out and to contract.

The question may be asked whether a chicken that picks up these gravid segments will become infested; or whether a Tape Worm passed by one bird can infest another bird that picks it up. The answer is "No". Before the eggs contained in a gravid segment can infest a bird, they must be eaten by one of the kinds of insects that are "intermediate hosts" for tape worm eggs. It is known that stable flies, earthworms, dung-beetles, grasshoppers, one species of red ant, and snails are intermediate hosts. There may be even more intermediate hosts than these that are known. After such an insect has fed on a gravid segment, the tape eggs become embedded in the body of the insect. While there, a tape egg undergoes a change. The head of the worm gradually forms, and is even armed with its suckers and hooks. When a chicken eats the insect, the worm heads are released, probably as the insect is being ground up in the gizzard of the bird. The tiny tape heads then pass into the intestines and attach themselves to some portion of the lining by means of their suckers and hooks. It is extremely interesting that each species of tape head will select its own definite part of the bird's intestines. The tape which is commonly called the "Microscopic" Tape Worm will attach itself only to the part immediately back of the gizzard, called the duodenal loop. The larger the species of tape, the farther back in the intestines it will attach itself. No one has been able to explain this. Then after the head has attached itself to the right place in the intestines, new segments begin to form back of that head, into a new chain, or "body".

With this understanding of the nature of worms and how they propagate, you can understand why it is important to keep growing birds entirely away from older fowls and, as far as you can, on ground that has not been used by other birds. Also you can understand why it is that even birds raised in wire batteries sometimes get Tape Worms, because it is almost impossible to keep them from eating insects that may get into their feed or water. Letting your birds range near the farm buildings or manure piles where there are many flies and bugs, is always dangerous. If it is impossible to range them away from ground which is likely to have worm eggs in it, plow or spade the ground once a month, to turn under eggs that may have been incubating on the surface.

Control. Until chicks are about 4 months of age Large Round Worms are the most common species which seriously harm them. Any control program to protect against heavy infestation of Round Worms should be started early in the chick's life.

As soon as young chicks are well feathered and the weather is warm enough so that they no longer require heat, they should be moved from the brooder quarters to ground which has not been occupied by older birds. If it is necessary to range the young birds on ground which has been occupied by older birds within the past year, such ground should first be plowed or spaded, to turn any worm eggs under.

Sanitation to prevent the development of round worm eggs should be practiced. The removal of droppings and litter, where birds are confined to a rather limited space, is a good practice. It should be removed every week or 10 days at most, and it should be promptly burned so that any worm eggs that may be in it will not become infective. Fill low, wet spots in the yards or runs, so that no water will stand in them.

Tonax is a valuable aid in the control of Large Round Worms. It contains Nicotine which is considered one of the best things for this purpose. In addition, Tonax supplies the growing birds with blood-building elements, trace minerals, astringents which help to relieve swollen intestinal tissues, and reliable stimulants, and it helps to build up the natural resistance

of the birds. Beginning when the chicks are 6 weeks of age, use 1 pound of Tonax well mixed in each 100 pounds of mash. This mash mixture should be fed through-

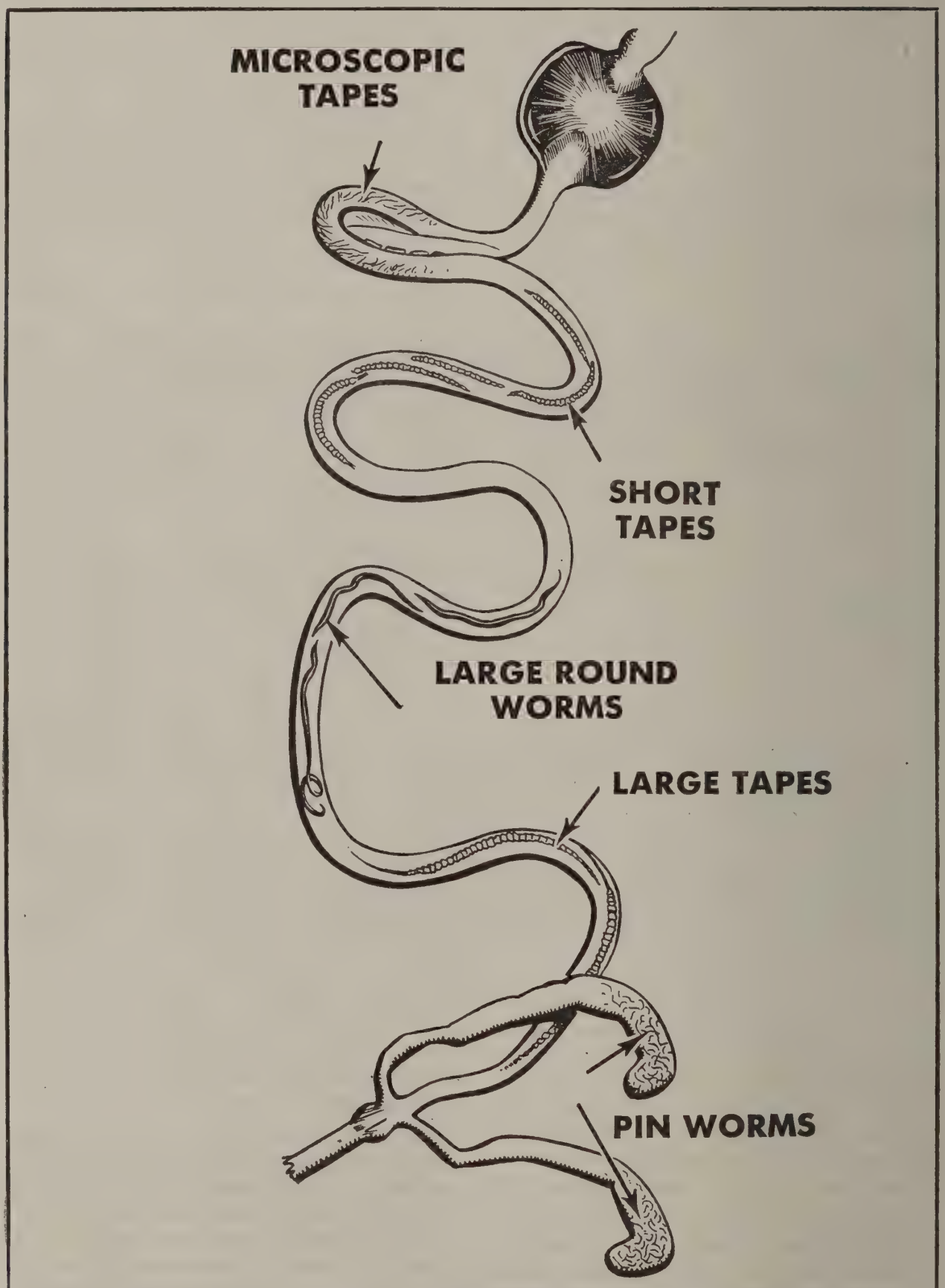


Diagram showing common location of different kinds of poultry worms found in the intestines.

out the entire growing period and until the birds are 4 months of age.

When the birds are 4 months of age and weigh 3 pounds or more, they should be wormed for all three kinds of worms, Large Round Worms, Large Tape Worms, and Pin Worms, with the Medium (Pullet) Size Gizzard Capsules. See Gizzard Capsules, pages 61-63.

FROM RANGE TO LAYING HOUSE

WORMS. On range the young birds pick up many flies and insects. It is natural for chickens to do this because insects help to supply needed proteins. The trouble is that many of these insects contain tape worm "eggs". By the time the pullets are ready to go in the laying house many of them may be quite heavily infested with Tape Worms and possibly with Round Worms and Pin Worms. Even birds raised on clean ground can get Round Worms and Pin Worms, as well as Tapes. The eggs of Round Worms and Pin Worms are too small to be seen. Often the wind will carry seeds and particles of dust big enough to be seen, for miles. The wind carries worm eggs from one farm to another, too. Giving your birds clean range is the best thing you can do to prevent worms, but it is no assurance that your young pullets won't get worms.

The safest thing to do is to worm each pullet with a Medium (Pullet) Size Gizzard Capsule just before putting her in the laying house. No one can tell by looking at a chicken what kind of worms she may have. Frequently young pullets may be quite wormy and yet not show much external evidence of worms. Therefore it is best to use a treatment like Gizzard Capsules which are for all three kinds of worms, Large Round, Large Tape and Pin Worms. See pages 61-63.

COLDS. Often within a week or so after pullets are put in the laying house, Colds start to develop. The birds are no longer getting the oxygen to which they were accustomed while on range. Also they are now in closer contact with one another. And all too frequently there are either drafts in which they sleep or poor ventilation. An outbreak of Colds is likely to cut down egg production for weeks or even months. You will do well to have a bottle of Leemulsion and some Vapo-Spray on hand, so that treatment can be started promptly at the first sneeze or sign of a watery eye or dirty beak. See pages 43 and 44.

CANNIBALISM. Some of the worst cases of Cannibalism occur shortly after the young pullets are confined in the laying house. Watch for signs of picking and if any appear, act quickly. A full discussion of Cannibalism will be found under that heading on pages 41 and 42.

DON'TS -

Don't overcrowd them. For light breeds allow 3½ square feet per bird, and heavy breeds 4 square feet.

Don't allow the litter to become damp. Keep at least 4 inches on the floor at all times.

Don't feed spoiled or musty feed. Use a fresh, well-balanced feed.

Don't let fountains or hoppers get dirty. Best to clean them each day.

Don't allow mites or lice to get a start. They are easily controlled with Lee's Mite Killer, Louse Powder, Perch Paint, or Blitspray.

Don't excite or frighten your layers. It sharply affects production.

Don't neglect the systematic use of Germozone. It reduces the danger of intestinal upsets.

Care of Adult Birds

Years ago serious disease epidemics were seldom known. A farmer might have a little trouble now and then with parasites or disease in a few birds. But the average flock was small and had the entire farm to range over. Nine times out of ten the birds roosted in trees or on the barnyard fence. They did not come in such close contact with one another, so disease had little chance to spread.

Today it is much different. The poultry industry has shown a remarkably rapid growth. Some idea of its size may be had from the fact that a full carload of eggs, consisting of 400 thirty-dozen cases (144,000 eggs), is produced in the United States every two and three-fourths minutes, day and night, all through the year. With this growth have come many new problems. The average flock is much bigger and has less ground to range. Most flocks now have good houses during the Fall and Winter. They receive the best of feed. Owners take steps to make them lay as many eggs as possible. Even lights are often used in the laying house to make the hens eat more and, therefore, lay more. All this is good business, but crowding the birds and forcing production have brought real problems of how to control both disease and parasites.

The housing of laying flocks greatly increases the danger of parasites and of disease too. And forcing production lays a heavy strain on birds and tends to lower their natural resistance to disease. When disease does break out in a laying house it usually spreads to most all of the birds quickly.

Disease is now the poultryman's greatest risk. But he can do much to avoid disease and keep his layers in good condition for heavy egg production. It takes a little work and some expense but is well worth the effort and money. The old axiom "an ounce of prevention is worth a pound of cure" was never truer than it is here. It means the difference, often, between success and failure with your poultry, between a nice profit and an actual loss of money.

Management for eggs and profit starts back in the growing period, before the pullets are put in the laying house. If there was any Pox (Sorehead) on the premises last year, or if there is any Pox in the neighborhood, the growing birds should be vaccinated. (See page 29.) Also, before the pullets are put in the laying house, each one should be wormed with a Gizzard Capsule. If they are not wormed, probably there will soon be in the litter so many worm eggs passed by some pullets that do have worms, that most every bird will get wormy and egg production will fall to almost nothing.

Before the birds are put inside make sure that the house is in good repair. Replace any broken window glass. Loose boards on the siding should be nailed. See that there are no cracks to let a draft in the house. And be sure that the roof does not leak. There must be no drafty places in the house, and it must be kept dry. Nests and roosts should also be in good repair and properly arranged. Old droppings and litter should be removed. Thoroughly clean and disinfect the house. Then after it has dried out well, scatter plenty of clean, fresh litter on the floor. A deep litter is best, and it should be stirred up occasionally to keep it dry and to "bury" any worm eggs and the germs.

Give the roosts and dropping boards a good spraying with Lee's Mite Killer the day before the birds are put in. Lee's Mite Killer will destroy mites that are so common in poultry houses, and it protects against mites all through the winter months. This should give the young pullet flock good, clean, comfortable quarters.

Also, after the birds are housed, disease must be guarded against. The intestines of all chickens contain germs. Most of these germs do not cause disease under normal conditions and if the birds are in dry quarters, free from drafts and are well fed. Then their natural resistance can probably hold the germs in check. But if a bird picks up too many of these germs, and they are allowed to "build up" in her

intestines beyond the point where her system can control them, they become harmful and may cause disease.

Then too, there are always some very dangerous germs lurking around in most every poultry house, in water, in feed, or in the litter. If a bird happens to pick up some of them, it is not long until she may become sick. Then they multiply in her rapidly and she spreads more of the same kind of dangerous germs in her droppings for other birds in the flock to pick up. And within a short time the entire flock is likely to come down with the same disease.

Not all disease can be prevented, but the dangers can be cut down very much if the floors, fountains and hoppers are kept well cleaned, and if Germozone is used in the drinking water twice a week or oftener. Germozone is very valuable in helping to keep disease germs down below the disease level.

Germozone destroys many disease germs with which it comes in contact right in the drinking water. And many germs do get into the water. They get on beaks as birds pick in litter and among droppings, and then they get washed off into the water when the birds drink. In that way they get inside of the birds and are likely to cause disease, if they are not destroyed in the fountain.

But even if all germs in the drinking water are destroyed there, many others are bound to be picked up from the ground and litter and get inside the birds that way. This is another reason for the regular use of Germozone in the drinking water of adult birds, because the work of Germozone does not stop at the drinking fountain. The Germozone is taken by the birds with their drink and has a very beneficial action against disease germs that get into the crop from the ground or litter.

And Germozone also has a third action to protect birds from disease. It acts against harmful bacteria even back in the intestines, besides having an astringent and healing effect there.

The regular use of Germozone for laying flocks is just as important as it is for baby chicks, or growing birds. Disease control is even more important for laying flocks than for chicks because each adult bird represents a greater investment.

The idea is not to destroy every germ, but it is to keep disease germs down below the disease level, just as a man cultivates his corn to keep weeds down, not completely out. For this, Germozone given regularly, at least twice a week in the drinking water of adult birds, is usually enough if they are well. For use in laying flocks Germozone will be found much more economical when purchased in the larger sizes.

Diseases of Adult Birds

BLOOD SPOTS. Blood spots in eggs are often quite a troublesome condition in some flocks. In the average size flock the eggs which contain blood spots are laid by one, or at most only a few birds. But identifying those birds is almost impossible. Small blood spots do not harm the egg for food purposes, but the consumer generally thinks they are spoiled. There are times when a considerable portion of the albumen, or white of the egg, may be so badly contaminated with blood as to give it the appearance of being almost pure blood. The only immediate solution for established customers is candling.

There are three principal causes of blood spots. One cause is due to the fact that when the yolk breaks loose from the egg-stalk, or egg cluster, to drop into the oviduct, or egg-tube, the small blood vessels do not re-coil, as they normally should, and therefore allow a small amount of blood to escape. The second, and probably the most common cause is due to an excessive irritation of the oviduct, or egg-tube, which causes a breaking down of some of the small blood

vessels supplying the oviduct. This may allow a drop or two of blood to get into the egg before the shell is formed. The third cause, which is probably rare, is the localization of harmful germs in the ovaries, or yolks, which gain admittance into the bird's system through the drinking water. Blood spots occur most frequently in eggs laid by pullet flocks which have come into high production, and usually in these cases the trouble gradually disappears.

There is no specific means of correcting this trouble. The use of an additional one pint of a good grade of cod-liver-oil, or other fish-oil, to each 100 pounds of mash has often been of value in clearing up the trouble. Feeding green feed for a short time has also proven helpful at times. A good deep litter on the floor to prevent the premature rupture of the egg-yolk, as the birds fly down from the roosts, is also a precautionary measure. Two tablespoonsful of Germozone added to each gallon of drinking water will help to assure against harmful germs which might gain admittance in the system through the medium of the water. Any radical change in feed is usually not desirable.

BOTULISM. This trouble is often called Limberneck because the muscles of the neck become paralyzed so that the bird is unable to raise its head from the ground. Botulism comes on quite suddenly, but usually only about two or three birds out of a hundred get it.

Cause. This trouble is caused by extremely poisonous substances that are given off by some germs found in decaying meat and vegetable matter. The germs that cause Botulism do not multiply in the birds and therefore Botulism is a poisoning, not a disease. Dead carcasses, like those of rats, chickens, pigs, or of other animals, should always be considered dangerous where chickens can get to them. Also some spoiled vegetables are just as dangerous as dead animals, especially canned beans.

Treatment. Wash out the crop with a Germozone solution, one tablespoonful to a quart of warm water, using a Lee Poultry Dosing Syringe if you have one. Empty the crop by holding the bird head down. Repeat this twice, and then fill the crop with the Germozone solution. Try to find what poisoned the birds, and bury or burn it so as to prevent the poisoning of other birds.

BRONCHITIS. Simple Bronchitis, Infectious Bronchitis, Laryngotracheitis and sometimes, bad Colds all show symptoms of difficult breathing, gasping for air, and rattling or sneezing sounds. Even experts cannot tell one from another without making laboratory tests. That is why poultrymen call any trouble in which birds have difficulty in breathing and show such symptoms, Bronchitis.

Colds are discussed on page 43. Although Laryngotracheitis is not very serious in young chicks, when adult birds get it, it is not usually helped much by treatment. See that title on page 46. However, as mentioned before, it is usually impossible to tell whether your birds have Laryngotracheitis or only a Cold or Bronchitis. It is true that Infectious Bronchitis is very dangerous for young chicks, but in adult fowls Bronchitis can usually be treated very successfully if the right kind of treatment is started soon enough. And Colds can be, too. Also, all of these diseases take the same kind of treatment. Therefore any time your birds have the symptoms described in this article start treatment—and start it promptly. For both Colds and Bronchitis it is very important for you to start the treatment just as soon as you can.

Hen affected with Bronchitis.

Symptoms. There is difficulty in breathing. The bird will occasionally extend its head and gasp for air. There are rattling or sneezing sounds which can be heard, especially at night after the birds have gone to roost. When laying flocks get these symptoms, egg production is likely to drop very rapidly. The bird chokes to death because of phlegm or mucus that collects in the windpipe. This strangling makes the comb turn to a dark purple just before death or shortly after the bird dies.

Postmortem. There is little change inside the bird's body except that if yo split open the windpipe you will find its lining to be inflamed. Usually the windpipe has in it mucus or phlegm which is likely to be streaked with blood.

Treatment. Three things should be considered in treating diseases of the air passages. *First,* see that the birds have comfortable and clean, dry quarters. *Second,* the mucus that forms in the windpipe must be removed, as much as possible, in order to keep the birds from choking to death. Vapo-Spray is very useful for this. After the birds have gone to roost, close the house reasonably tight and spray Vapo-Spray over their heads

until you have made a light fog, or mist. Repeat this every two hours until they have had three sprayings. Spray twice during the day; in the morning and again at noon. Keep this up as long as necessary. *Third,* from the first, give Leemulsion, either in the drinking water or in the mash. If you give it in the drinking water, use one tablespoonful of Leemulsion to each gallon. If you put it in the feed, give one tablespoonful for each 50 fowls. This will aid in relieving the inflammation. Continue the Leemulsion in all drinking water or in each feed for three days. After three days if treatment should be kept up, Vapo-Spray alone may be used. Read about both Leemulsion and Vapo-Spray on pages 70 and 71.

BUMBLEFOOT. This is the name for an abscess on the ball, or bottom of the foot. It is caused by an injury or bruise. In scratching, birds sometimes break the skin of the pad, or ball of the foot. Then germs, especially pus-producing ones, may get into the opening. An infection results, similar to a boil, with deep cores. Birds sometimes get Bumblefoot by flying or jumping from high roosts to floors not covered with enough litter to avoid bruising.

Symptoms. This trouble is seldom noticed until the bird gets lame. Then if you look at the bottom of its foot, you find a swelling on the pad and usually one or two scabs on it. If you remove the scabs, you will find cores like those of a boil. They usually run well down into the pad of the foot.

Treatment. The cores are dead tissue and must be removed. If you cannot squeeze them out, try to remove them with the sharp point of a stick. If that does not work, split the pad of the foot with a sharp knife deeply enough so that all of the cores can be removed. After you get the cores out, pour full strength Germozone into the wound. Make sure it gets clear inside to the bottom of the wound, and then bandage the foot. Put the bird in a small coop so it can be kept quiet for a few days. Generally one treatment will do but, if not, the treatment should be repeated on the third day.

CANNIBALISM. Cannibalism is not a disease. It is a habit but it causes as much loss as most infectious diseases cause.

Late in the growing season some flocks start feather pulling. This should be taken as a warning that such a flock is quite likely to develop the habit of Cannibalism when the birds are put into the laying house. Sometimes birds will start picking one another within a few days after they are housed. This is more likely if they are overcrowded. (Light breeds should have 3½ square feet of space, and heavy breeds 4 square feet per bird.) Heavy losses are frequently suffered from the vicious habit, especially among Leghorn pullets, shortly after they are housed.

Usually Cannibalism is most serious after the pullets come into lay. As pullets start to lay, their eggs are often misshaped. Some are small, of "pee-wee" size, while others are even larger than normal. Sometimes, as a result, the oviduct, or egg tube of some young pullet turns wrong side out. This is called Eversion, or Prolapse of the Oviduct. People sometimes call such cases "Blow-outs". The mass of tissue outside of the vent is of a blood, or dark red color. It naturally attracts the attention of other birds, and they take a pick at it. Often such picks draw blood,—and once the others get a taste of the blood it is not long until they pick the suffering bird beyond hope of recovery. In some outbreaks the habit may become so vicious that they will even pull the entrails out of such a bird.

Many things have been proposed to cure Cannibalism. Some poultrymen and scientists were of the opinion that it was a feed problem. But experiments of changing the protein contents in the feed did not prove that a change in diet would break the habit. It was then thought that possibly the birds did not get enough salt, so an extra 1% of salt was added to the ration, but no marked results could be noticed.

Different kinds of mechanical devices for fastening to the beaks of pullets are on the market. The best ones have been very successful.

The feeding of whole oats or whole bar-

ley, kept in hoppers before the flock from the start of the growing period, has also proved well worth while. The fiber hull of these grains seems to contain a substance that keeps down Prolapse, and when Prolapse does not occur there is not so much danger of serious Cannibalism. The prompt use of Pickpaste at the first sign of picking and before the habit becomes strong, will help, if the young birds are not overcrowded. (See page 73.)

CHOLERA. Cholera never occurs in young chicks, and seldom in growing birds, but it often breaks out in flocks after they have been housed. For that reason the heaviest losses from Cholera come during the Fall and Winter. The disease is caused by a specific kind of germ which multiplies very rapidly in the blood stream. Cholera takes one or the other of two forms, either acute or chronic.

Symptoms. Acute Cholera comes on very suddenly and often causes heavy loss. Some birds may drop dead from the roost or die on the nest. This is especially true of very fat birds. But in the normal attack the bird will show evidence of being sick for three or four days.

In the very acute form of Cholera there are no outward symptoms because the birds die so quickly. But in the average acute case there is a greenish or yellowish diarrhea. A thick, sticky mucus forms in the mouth and throat, and sometimes it causes a rattling noise when the bird breathes. The appetite is poor but a high fever causes an increased thirst. The comb and wattles often become purplish in color and the bird acts sleepy. The feathers about the vent generally become badly smeared as the result of the severe diarrhea.

The chronic form is generally a "hangover" from an acute outbreak. Probably because of an unusually strong resistance, some of the birds not only came through the acute attack, but did not even show the symptoms of the acute form. In the chronic form the birds are sick but they do not have the severe symptoms of the acute disease and they sometimes linger for several weeks before dying. In these cases there may be no diarrhea and the comb becomes pale. The bird gradually gets weak and thin, even though the appetite remains fairly good.

Some birds get over Cholera and appear quite normal. But they will always be carriers of the Cholera germs and are likely to cause an acute outbreak if they are put with a healthy flock.

Cholera germs are often found as one of the kinds of germs in the mixed infection in some cases of Roup. See Roup, page 48. Again, they may combine with the virus of Laryngotracheitis or of Bronchitis in the windpipe or in the bronchial tubes. See Bronchitis, page 39. Sometimes the Cholera germs will center their attack on the wattles. Then the wattles may get two or three times their natural size and may become hard.

Postmortem. In acute cases very small red spots will be found in the ring of fat around the top of the heart, or in the heart muscle. The intestines, just back of the gizzard, are often a fiery red on the inside. The blood vessels, especially those supplying the internal organs, appear to be almost bursting with blood. The skin may be quite pink instead of the white or yellow color which is normal.

In chronic Cholera the disease germs may attack any part of the bird's body, and abscesses may be found in any of the internal organs or in the joints or wattles. The sac around the heart may be filled with a straw colored fluid, and quite often there is a hard, cheesy mass in the air sacs near the lungs. The liver is generally either much darker or considerably lighter in color than normal. The part of the intestines immediately back of the gizzard will usually contain a yellowish, sticky material. Very often a dried, yellowish, cheesy material, like a cooked egg-yolk will be found in among the intestines, or on some of the internal organs.

Treatment. Medicines are of limited value, and in acute Cholera are usually of no value for curing birds. In fact, it is not desirable to "cure" birds that actually come down with Cholera, because they would be carriers of the disease. It is better to get rid of them and to do all you can to get rid of the infection in

your flock and to keep well birds from getting Cholera. You can do much by vigorous sanitation and by building up the natural resistance of the well birds so that they can overcome the germs that do get into their systems or can keep them below the disease level. Prompt removal of dead birds, and killing and burning of sick ones, should be the first step. Then clean and disinfect the buildings and equipment. Every effort should be made to build up the resistance of the entire flock. For this purpose Tonax, two pounds to each one hundred pounds of mash, should be fed for one week. After the first week Tonax can be reduced to one pound per one hundred pounds of mash. Germozone, two tablespoonfuls to each gallon of drinking water, is not only helpful in preventing the spread of Cholera germs through the water, but it is also of value in relieving the irritation of the lining of the intestines. Vaccination is sometimes practical, but its results vary a good bit.

COLDS (SIMPLE CORYZA). Probably close to 90% of the average poultryman's disease problems are Worms, Coccidiosis, and Colds. The term, Cold, is used for a number of common symptoms —just as it is for Colds in human beings. In mild Colds perhaps the only symptom that will be noticed is a frequent shaking of the head. In such mild cases there probably is not even a drop in egg production—at that stage. But in other cases Colds may be much worse and may show watery eyes, running nostrils, dirty, wet beaks, and even may run into Ocular Roup. In these bad cases there is usually a marked falling off in mash consumption, and also in egg production. You can tell a Cold—even a bad one—from Ocular Roup because in Ocular Roup there is a foul odor.

A Cold should never be neglected, even a mild one, because it is frequently the forerunner of more serious troubles. This is especially true in laying flocks. A sharp drop in egg production often results from a Cold. And a Fall Cold, if not promptly treated, may result in a big loss of eggs all through the Winter. Also, a severe case of Ocular Roup may follow a neglected Cold, and is likely to cause you a heavy loss of valuable birds.

Cause. The true cause of Colds has not been learned in spite of a great deal of research in human medicine and in veterinary medicine. Just as a mother often can say correctly "Little Johnny has a Cold because he went without an overcoat and got his feet wet", so it may also be true that "My pullets have a Cold because they were crowded in a damp house". These two statements both bring out the fact that—regardless of the real cause of Colds—Colds do frequently follow faulty management.

People often think of Colds in connection with Fall and Winter months. The fact is that some of the worst Colds—in poultry and people—are "Summer Colds".

Treatment. Provide proper ventilation, without drafts, and avoid overcrowding. Keep the house clean and dry. Include in the ration, mash containing alfalfa leaf meal and Cod Liver Oil. Add Tonax to the mash, one pound to each one hundred pounds of mash or, if you have only a few birds, one ounce to six pounds. See page 66. Spray with Vapo-Spray (page 71) two or three times in the evening after the birds have gone to roost. It is good to use Leemulsion too (page 70) either in the drinking water or in the feed.

Many poultrymen prefer to put Germozone in the drinking water, instead of Leemulsion. This has been a practice of thousands of poultrymen for a great many years, and apparently with good results. The Germozone helps the birds overcome an irritation in the intestines which is very common in Colds. But Leemulsion can be expected to give prompter results for Colds than Germozone alone. Many poultry raisers use both when their birds have a Cold, Germozone in the morning drink and Leemulsion in the drinking water given in the afternoon. But Vapo-Spray should always be used.

EGG EATING. A habit related to mild forms of cannibalism that may cause some trouble to flock owners. The underlying cause is usually lack of diligence in providing adequate nesting facilities. Nests should be provided for pullets in anticipation of the

lay, and sufficient nests should be afforded to take care of heavy production. Eggs should be collected three times a day, and remember that the morning is usually the time of heaviest production.

Like all habits, egg eating can be stopped most easily in the early stages. Provide one nest for every six hens. Chickens still prefer privacy in laying, just as their wild sisters instinctively seek a quiet protected spot. If a dark area of the house wall cannot be used, cover the nest entrance with curtains that combine protection with easy access. Collect eggs five times each day for a week or so, until the trouble is no longer noticed.

In connection with this habit, china eggs are sometimes quite useful when they can be obtained. These artificial eggs were used at one time to encourage laying. For various good reasons this practice has disappeared, but glass or china eggs do seem to discourage the habit of picking at eggs. At times it is advisable to remove bad offenders from the flock when detected.

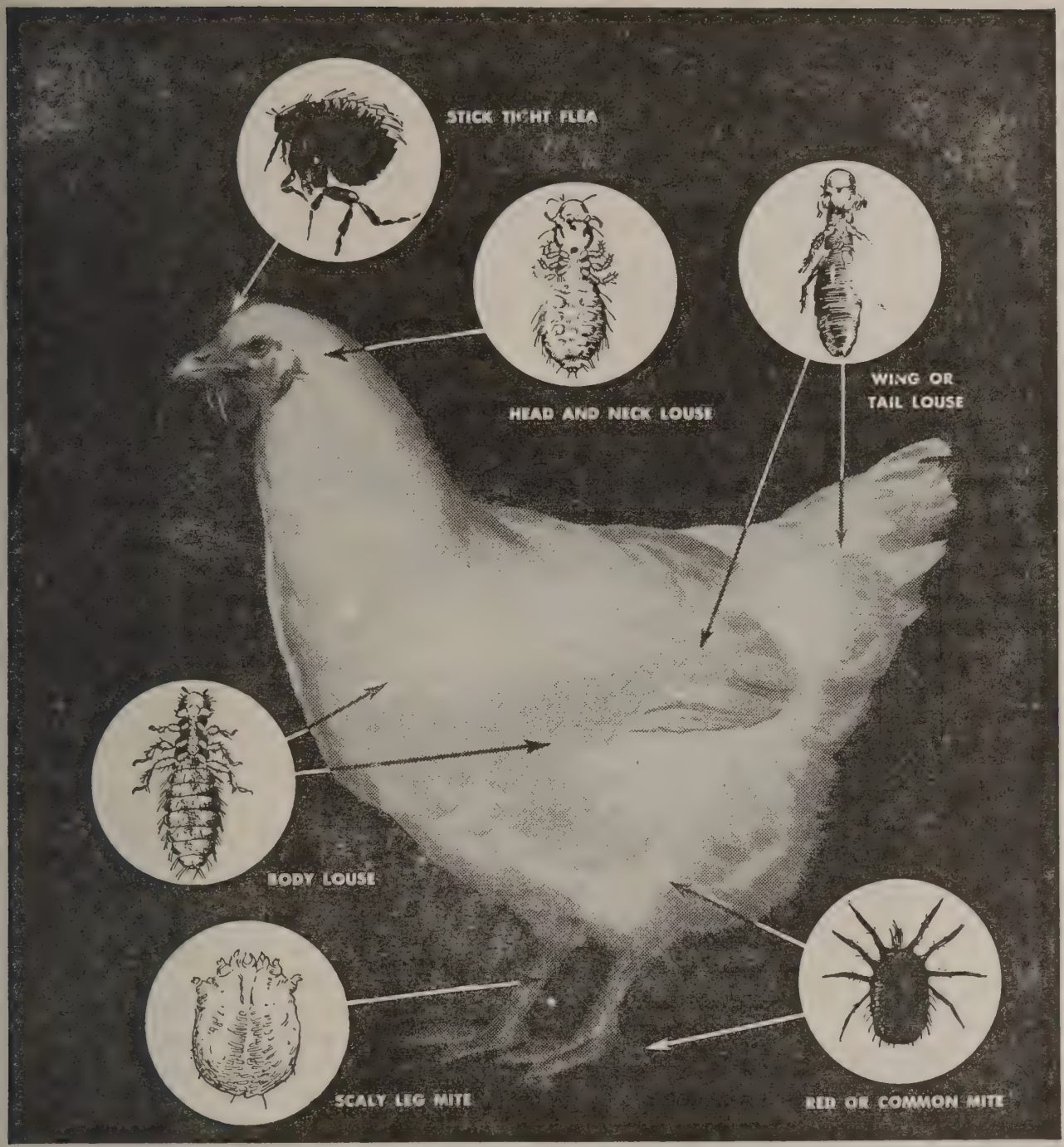
EXTERNAL PARASITES. There are quite a number of external parasites of chickens and turkeys. The more common are Lice, Mites, Bluebugs, and Fleas. These parasites are very annoying and irritating to birds and they cause heavy losses. Their losses run into the millions of dollars every year. They check proper development of growing birds, they cut down egg production, and they bring about poor fertilization of eggs. Sometimes they even cause death, especially in young birds.

LICE. There are several kinds of Lice, such as Head Lice, Body Lice, and Feather Lice. All of these live, breed, and die on the body of the bird. They bite the skin causing a great deal of irritation. They annoy the bird day and night, so that it gets no rest whatever. This prevents the bird from eating properly. If there are enough Lice, they will reduce the resistance of the bird to the point where it cannot withstand ordinary diseases, and they will prevent good egg production.

Frequent examination for Lice should be made. Every week or so pick up a bird and run your fingers through its feathers and fluff, to see if there are any Lice on it. Lice are small, about the size of a pin head, and are grayish in color. They can move fast, therefore you have to look closely for them. Lice are not hard to control or to clean up. See pages 74-75 for treatments. No treatment will kill louse eggs, or nits. The nits hatch out in ten days, so unless a second treatment is given it will not be long until the birds are as lousy as ever. A second treatment about ten days or two weeks after the first, kills these young Lice that hatch from the nits, before they can lay more nits. This completes the job of getting rid of Body Lice.

RED MITES. The habits of Mites are different from those of Lice. During the day Mites hide in the cracks and crevices of the roosts, walls and nest boxes. Then at night when the birds have gone to roost, they come out of their hiding places and swarm over the birds. These blood-suckers then fill themselves up with blood of the birds, so full that they change from gray to red. That is why they are called Red Mites. Mites pester the birds all night so that they cannot get their needed rest. They are one of the most destructive of all parasites and can tear down the natural resistance and health of a flock quickly. They are even suspected of spreading Paralysis and Pox. The liberal use of Lee's Mite Killer (page 77) will clean out the Mites. Two good sprayings a year with Lee's Mite Killer will keep the house free from Mites. Nothing can help the general health of your birds more than to save them from Lice and Mites, Bluebugs or Fleas. And it is absolutely necessary if the birds are to lay well.

BLUEBUGS. Bluebugs, or Fowl Ticks, are common in the South, especially in the Southwestern States. Their habits are similar to those of the Red Mites. They attack the birds mostly at night, and hide in cracks and crevices of the Poultry house during the day. And, like Mites, they are blood-suckers. They are hard to get rid of, once they get a good start in a poultry house. Spraying the house well, even the ceiling, with Lee's Mite Killer at one week intervals, is the best thing to do.



Showing common location of external parasites which attack chickens. These pests cause a great deal of damage.

This must be kept up for three or four weeks or even longer. It sometimes takes a lot of patience and perseverence to get rid of Bluebugs. But spraying a number of times is better than having to burn down the poultry house.

STICKTIGHT FLEAS. In the South poultry raisers are often troubled with Sticktight Fleas. These pests breed in dust on floors of the house and in yards. Like Bluebugs and Mites, they are blood-suckers. They attach themselves to the head or under the wings of a bird and usually form in clumps, or clusters. Because they cling so tightly the name Sticktight Fleas has been given them.

They can usually be prevented by scattering Lee's Dri-Rub in houses and breeding places, using 1 pound for every area five feet square. (4 pounds per 100 square feet). Spray houses with Lee's Mite Killer. Blitspray can be sprayed directly on

the heads of birds over two months of age.

FEATHER MITES. There is a true Feather Mite, often called the Northern Fowl Mite. It resembles the common Red Mite in everything except daytime habits. The Red Mite attacks the bird only at night, but the Feather Mite spends its entire life on the bird. The Feather Mite will be found chiefly around the vent and tail, and the fluff around the vent is often soiled.

Treatment. Any Mites found on the birds during the day can best be treated with Perch Paint. Use it as directed on page 75. Putting a few drops on each bird always works. The painting of perches is enough if the ventilation is controlled. Mites that you find on the birds may not be true Feather Mites. It may be that they are ordinary Red Mites that have not left the fowls. For that reason the dropping boards and roosts should be treated with Lee's Mite Killer as directed at page 77.

LARYNGOTRACHEITIS. This disease presents quite a problem for both the poultryman and hatcheryman. It is impossible for them to tell it from Infectious Bronchitis and from some of the infectious forms of Colds. In all of these diseases, gasping is the chief symptom, and the only way they can be told from one another is by laboratory examination.

Laryngotracheitis is a virus disease. That means that it is caused by an organism too small to be seen even with a microscope. In acute outbreaks it affects the opening into the windpipe, called the larynx, and also the trachea, or windpipe. That is why it is named Laryngotracheitis, which means an inflammation of those parts. In the less acute cases the inflammation may not be so bad, but in such cases the inflammation usually reaches up into the air passages of the head, and to the membranes of the eyes. Then we have symptoms like those of Roup. Laryngotracheitis may affect birds of all ages, but it is usually very mild in young chicks and often causes little or no losses among them. The older the birds are when attacked, the worse the attack usually is. In laying flocks, besides a big drop in egg production, the deaths often run as high as 70% of the entire flock.

Acute outbreaks come on very suddenly and run a rapid course of about one week. Less acute outbreaks may run for many weeks and the poultryman may suspect either bad Colds or Roup.

Symptoms. In acute cases the bird extends its head and gasps with almost every breath, but in the less acute cases the birds do not gasp so often. In older birds, if the attack comes on suddenly and spreads rapidly it is a pretty safe bet that it is Laryngotracheitis. In young chicks it is more likely to be Infectious Bronchitis. See Bronchitis, page 10.

Postmortem. If the case is acute, there will be an inflammation of the membranes of the larynx. Also there will be bloody mucus in the windpipe. In less severe cases, very little change will be found in the larynx and windpipe, but there may be a reddening of the lining of the eyelids.

Treatment. In severe outbreaks no treatment seems to be of much value. But since this disease so closely resembles several of the other diseases of the breathing passages which can be successfully treated, the only sensible thing to do when your birds start gasping is to figure that the trouble may be one of those diseases and start treatment for them. Use Vapo-Spray and Leemulsion according to directions described on pages 70 and 71. The virus causing this disease is killed by one part of Lee's Creosote Dip in 80 parts of water. Following any outbreak of this disease disinfect the buildings and equipment thoroughly with that solution after burning all of the old litter and carefully cleaning up fountains, feeders, roosts and nest boxes.

Vaccinating birds over two months of age is sometimes practiced, with good results. The vaccine should not be used on premises where this disease has not occurred, nor has it any value after the disease breaks out. Cleanliness and good care should be practiced in all instances during, and following an outbreak. See Bronchitis, pages 39-40-41.

LAXATIVES. There are times when a flock should be given a laxative. But be careful not to give your birds too strong a dose. Epsom Salts is a common poultry purge. It is as satisfactory as any, is easily given, and is inexpensive. If a laxative is needed, give Epsom Salts. Put the amount of salts in the amount of drinking water recommended below and give it to your birds the first thing in the morning, a short time before you feed them. Leave it before them for about three hours. Then take it away and give them plain water.

For birds of 4 months or older, give 1 half-pound of salts to 2 gallons of water for 100 birds. For fewer, 1 ounce of salts in 1 quart of water for each 12 birds.

For half-grown birds, use one-half of that much salts but in the same amount of water.

For chicks, not over 2 heaping teaspoonfuls of salts to a gallon of water. Do not dose them again for at least a week.

LIMBERNECK. (See Botulism, page 39.)

PARALYSIS. (See Paralysis, page 24.)

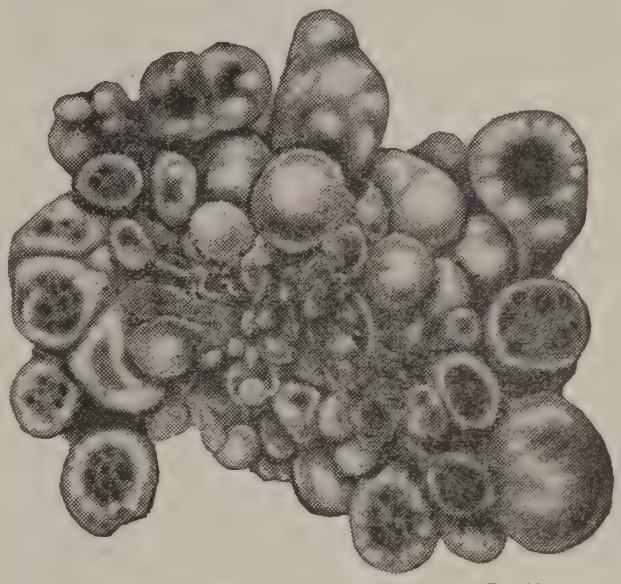
PARATYPHOID. (See Paratyphoid, page 27.)

POX. (See Pox, page 28.)

PULLORUM. This disease often causes very high death losses in chicks under three weeks of age. See page 15. And older birds may have Pullorum germs in their system too, but those germs only rarely cause any noticeable symptoms in a pullet or hen. When adult birds do show external symptoms of Pullorum, there are usually a Diarrhea and a general unthrifty condition. A postmortem may show an inflammation of the heart sac, and usually some of the ovaries have a greenish or brownish color. In the case of older birds Pullorum is not an acute flock disease.

Pullorum germs frequently locate in the ovaries of an affected pullet or hen. Such birds are called carriers. Many of their eggs are infected with Pullorum and when a chick is hatched from such an egg, it is infected too. Pullorum disease is often passed to the chick through the egg from a hen which shows no symptoms of the disease. Pullorum can be spread from one bird to another through the droppings.

Nearly all hatcherymen are now carefully testing the breeding flocks which supply them with eggs. Much credit is due the hatchery industry for their splendid work in reducing this dreaded chick disease to a point where it is no longer of such great economic importance.



Diseased ovary of Pullorum Pullet. Many ovules are badly infected.

Normal ovary for comparison. Note the round, healthy ovules.

ROUP (NUTRITIONAL). Nutritional Roup is not spread from one bird to another and does not have the bad odor. It is the result of a lack of sufficient Vitamin "A" in the diet. In Nutritional Roup the most prominent symptom is a white, cheesy mass that forms in the eye. The treatment is to squeeze out that material

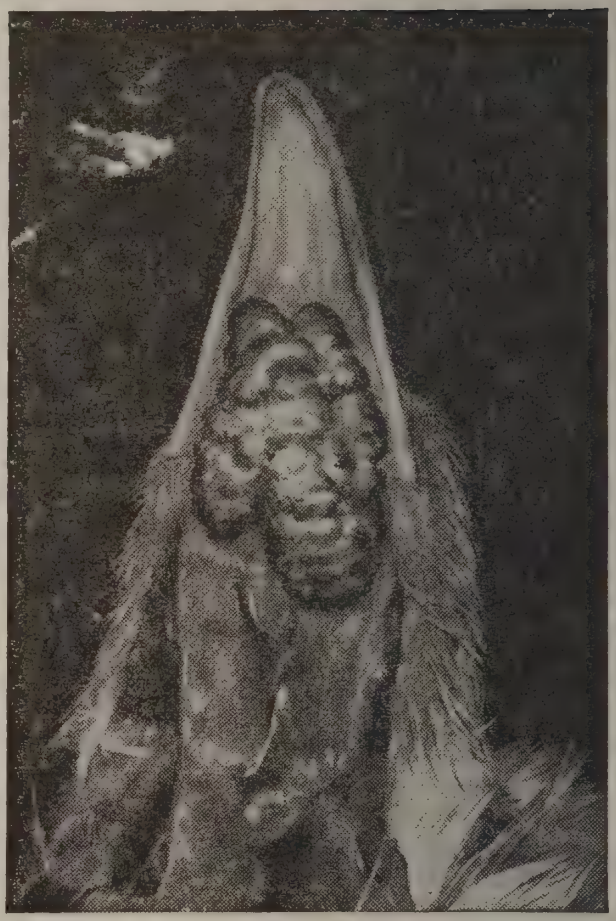
in order to relieve the pressure, and of course, to supply the needed Vitamin A. This can be supplied by feeding 3% Cod Liver Oil in the feed. Most commercial mashes contain 1% of Cod Liver Oil and that is as much as is advisable ordinarily. But in case of Nutritional Roup the Cod Liver Oil content can well be increased. Vitamin A can also be supplied by feeding ample amounts of green alfalfa or alfalfa leaf meal.

ROUP (OCULAR). Ocular Roup in most cases follows a neglected Cold. The general view is that it is caused by a virus, but in the average case several different kinds of germs are also present including pus producing germs. Whatever the cause of the Cold may be, the irritation of the nasal membranes makes it easy for different kinds of germs to get a start. Therefore we find a mixed infection.

In this common kind of Roup there is often a bad smelling, thick discharge from the head. The feathers under the wings may be found matted from the nasal discharge. If the disease is not stopped, that discharge backs up into the sinuses and causes the eyes to become swollen and even to bulge out. This condition is called Ocular Roup. Sometimes there are soft cankers in the mouth or throat.

For treatment of Ocular Roup. Follow the directions for treating Colds. See page 43. Because the infection usually is pretty far advanced and deep seated, it is advisable to use both Leemulsion and Vapo-Spray. Keep the birds, including the well ones, as comfortable and dry as possible. And since the disease is very contagious, of course the sick birds should be kept away from the others and you should do what you can not to let the disease spread. It is important to keep up the resistance of the well birds by the best of care. Add Tonax to all mash.

Ocular Roup showing swollen sinuses.



Canker formed in roof of mouth as a result of Roup.

Wash the head out with an antiseptic Germozone solution. For this, use the Lee Poultry Nasal Syringe if you have one. This is especially important if the eyes have begun to swell, and also to help prevent such swelling. If you do not have a Lee Poultry Nasal Syringe and, because of the War, cannot get one, then follow the directions on page 57 for dipping the head of the fowl into a Germozone solution and massaging the mouth and head. A bird with chronic Roup should be killed because it is a constant danger to other birds.

SCALY LEG. This condition is caused

A typical case of Scaly Leg.

by a small mite which burrows under the scales of the legs. This is a different kind of mite from the common Red Mite. The irritation caused by the mites causes the scales to turn out, and gives the legs a scabby appearance. Where Lee's Mite Killer is used regularly on the roosts this trouble seldom occurs.

Treatment. Dip the affected parts of the legs in a solution of one part of Lee's Mite Killer to one part of motor oil. Do this in the morning so that it will drain off before night. Spray the roosts, dropping boards and other parts of the poultry house liberally with Lee's Mite Killer as directed on the can.

SOFT SHELLED EGGS. Occasionally some birds in a flock lay soft shelled eggs. In some instances no shell at all can be found. This trouble is more likely to happen in a flock of young pullets just coming into lay, but sometimes it occurs in older flocks toward the end of the laying season.

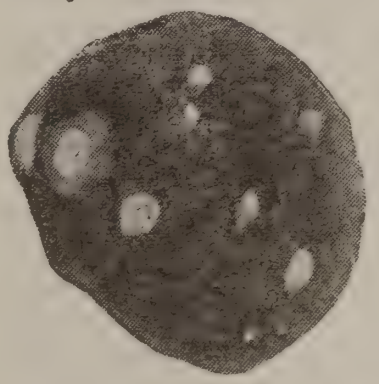
Several things may cause soft shelled eggs. Probably the most common one is a lack either of enough calcium (lime) in the diet, or of enough Vitamin D for the bird to make use of the calcium. Oyster shells are commonly fed to supply calcium; limestone, or any form of slacked lime can be used. Ample sunshine is rich in furnishing the necessary Vitamin D, but where this is not available Cod Liver Oil can be used. Nearly all commercial feeds contain 1% of Cod Liver Oil and that is as much as is ordinarily required, but this amount is sometimes not enough. Then it is advisable to increase the Cod Liver Oil content by another 2% for a while. Very often the trouble will clear up to a great extent without anything being done about it.

There are other causes of soft shelled eggs in the case of an occasional bird, such as an abnormal condition of the oviduct (egg tube) or an improper functioning of the glands which secrete the shell-forming substance. But nothing can be done for such a case.

TUBERCULOSIS. In some parts of the Country, Tuberculosis is still a serious problem. It is a disease of adult fowls, and seldom affects birds under one year of age. Hogs can get Tuberculosis from chickens, but people cannot.

Symptoms. In the early stages of Tuberculosis there are no outward symptoms. But later, a lameness in one or both legs generally appears. The bird loses weight very rapidly, and poultrymen often say that the bird is going light. The comb generally remains a good, red color, and the appetite is usually good until the last.

Postmortem. Tuberculosis in chickens seldom affects the lungs. Cheesy spots, or lumps are found on the liver, spleen, or possibly on the intestines. The spots are always raised above the surface. Such



Tubercular Spleen. Similar spots can generally be found on the liver.

spots on the spleen are the surest sign of Tuberculosis. If they are found there, it is always safe to diagnose the trouble as Tuberculosis.

Prevention. There is no cure for Tuber-

culosis. Kill and burn the affected birds. Clean up the premises and disinfect thoroughly. See Lee's Creosote Dip, page 78. The Tuberculin test can be used to pick out any birds that have the disease, but the test should be made only by a Veterinarian.

If Tuberculosis gets started, it is advisable to sell one's entire flock at the end of each laying year and to start with young chicks each year, for four years. In this way one can get good egg production during the Winter months, and never have birds more than a year of age. If such a plan is followed for four years, the infection usually dies out, and it should be reasonably safe after that to hold good layers over as may be desired.

TYPHOID. This is an infectious disease caused by a specific germ. Typhoid germs get into the blood by way of the intestines. They multiply in the blood and affect the blood and most of the internal organs, especially the liver, spleen, and intestines. Usually Typhoid is found where conditions are unsanitary, but it can be carried from one poultry yard to another on the feet of animals or on people's shoes. Poorly drained soil is a likely place for the development of Typhoid germs, and if birds drink stagnant water there is danger that they may come down with the disease.

Symptoms. There is a loss of appetite, together with dullness, and increased thirst. The comb and wattles turn pale, except in the very acute cases, and then they turn dark. The droppings are soft and yellowish or greenish. In acute Typhoid the birds may die quite suddenly, much as birds with acute Cholera often do. But usually in case of Typhoid the birds will linger for several days to a week or more before they die.

Postmortem. The liver is considerably enlarged and in most cases has a dark greenish appearance. In some cases it may be a mahogany color. It is usually soft, and will break down easily when rubbed between the thumb and finger. The spleen is swollen and is a dark or purplish red. The internal organs, and especially the lining of the intestines, are generally very pale. The blood is usually of a lighter red than normal, and it does not clot so easily as normal blood.

Treatment. It is not practical to try to treat birds sick with Typhoid. They are passing large numbers of Typhoid germs in their droppings, so it is best to kill and burn the birds as they show sick. Good sanitation will do more to control Typhoid than any other thing. Move the well birds to clean quarters. If this is not possible, do all you can to clean the old quarters and to thoroughly disinfect them. Clean out and burn old droppings and litter. Disinfect the buildings with one part Lee's Creosote Dip to 80 parts of water. Use two tablespoonfuls of Germozone to each gallon of drinking water. See that the birds do not get to any stagnant pools where they might drink. Fowl Typhoid bacterins have been used to some extent but even when they are used, results will be much more satisfactory if you follow these directions for sanitation.

WORMS. The common poultry worms are fully treated at pages 30-35. Worms in chickens over 6 months of age often cause greater loss than worms in younger birds. Besides causing loss of weight and hurting the general health of the birds, worms knock egg production. Very often they are the principal cause of poor egg production.

Both pullets and adult birds should be wormed with Gizzard Capsules before they are put in the laying house in the Fall. Even so, an occasional flock may be slow in coming into production or may not lay better than 35% or 40% regardless of worming and of good feed and care. Usually the reason for this is that the birds were so wormy that they could not be completely wormed with only one dose of any medicine that could be given safely. A worm medicine must not be so strong as to injure birds. Therefore it is sometimes advisable to worm a flock again, after it has been housed. Catching and handling birds to dose them, can cause a little drop in production for two or three days but getting rid of worms will make it possible for the birds to lay as they should.

Better Flock Management Means Greater Profits

Better flock management involves five important things: — Breeding, Feeding, Housing, Culling, and Sanitation. To guess which comes first is like guessing whether the hen or the egg came first. You had better think of each of these subjects as representing a link in a chain, and that chain being only as strong as its weakest link.

For instance, the national average of eggs per hen in 1942 was 113. By purchasing chicks from strains known to have a high egg record, the annual production could well be 165 or 175 eggs per hen, instead of 113 eggs. You see, to get more eggs, it is necessary to get chicks which are capable of laying more eggs, so buy chicks from the best laying strains you can find.

Feeding is a most important matter this year. There is a critical shortage of feed, and it is extremely important that none be wasted. Use hoppers that are as nearly waste-proof as possible, and it's best not to fill them over two-thirds full. Use a good feed—preferably a good commercial feed. Consult your local feed dealer as to his best feed adapted to your need.

Housing is also an important matter. It should be clean, dry, and free from drafts. It is your flock's home, and it should be kept so that it is a fit, and favorable place for your birds to live.

Culling is of special significance this year. With the critical shortage of feed, we dare not waste it on unprofitable birds. Careful and frequent culling of under-developed birds, non-layers, or birds showing evidence of paralysis, or other disease, is good economy during normal times, but particularly is this true now, when every bit of feed should be utilized only by profitable birds.

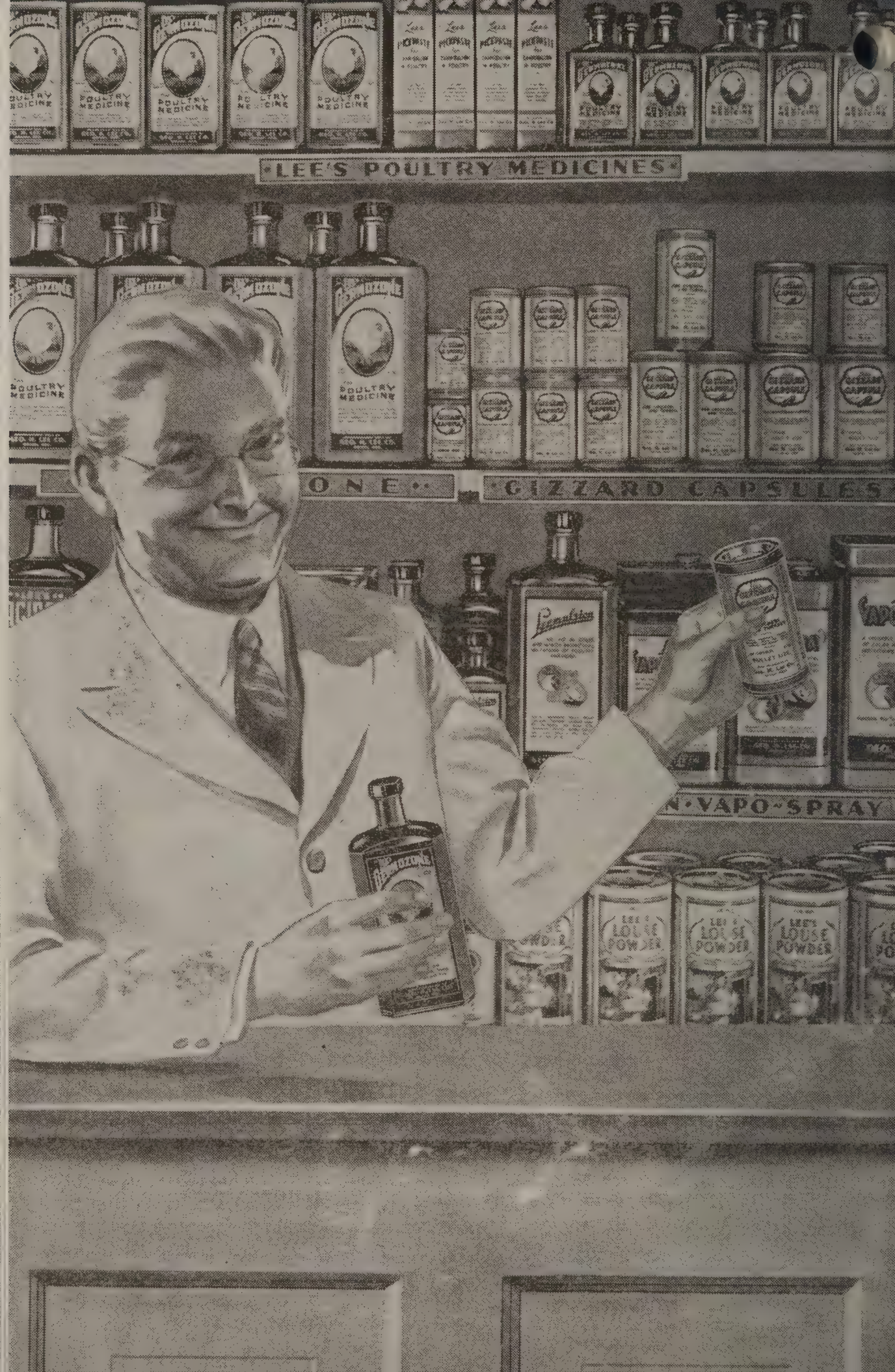
Sanitation is of utmost importance in the care of poultry, just as it is in the everyday life of people. To a great extent, disease is preventable by cleanliness and sanitation. But chickens live in close contact with one another, eat from a common feed trough, drink from the same fountain, and pick up food particles from among their droppings. It is impossible to keep poultry under conditions anywhere nearly so hygienic as those under which people live—and we know that disease does come to people. No good doctor would tell you that all people need to do is to practice sanitation and that then they will never need medicine.

It is the same with poultry. Even if your birds come from good parent stock and get the best of care, you will have to reckon with poultry disease. It will pay to do all you reasonably can to prevent disease. You can do a lot along that line. But in spite of all you can do, disease often comes and, unless prompt and effective steps are taken, it may spread quickly through the entire flock.

You need a fair understanding of the more common poultry diseases, of their symptoms, of what to do to prevent them, and of how to treat them. The first part of this book gives you that information.

For many poultry troubles there is a Lee Remedy that is helpful and when that is so, it is recommended. But if no medicine can do any good, or if only a change in feed or management is required, this book tells you so.

During its 50 years of study, experimental work and of service to the poultry industry, the Geo. H. Lee Company has perfected a full line of poultry medicines. But in order to use them with best results, you should have a pretty clear understanding of each remedy, how it works, and when and how it should be used. The following pages will give you that understanding.


LEE'S POULTRY MEDICINES
POULTRY MEDICINE
ONE
GIZZARD CAPSULES
VAPO-SPRAY
LOUSE POWDER

YOUR LEE DEALER

Can Help You with Your Poultry Problems

Lee Remedies are sold only by Lee Dealers. They are druggists, feed dealers, hatcherymen and other established merchants. We sell to users direct from our factory only in communities where there happens to be no Lee Dealer, or if the Lee Dealer happens not to carry the particular Lee Remedy which the poultry raiser needs.

We do not employ any peddlers or canvassers. Our representatives do not call on a poultry raiser except at his Lee Dealer's request and then only with the Lee Dealer, to give his customer help regarding the care and management of his flock.

The Geo. H. Lee Company is very particular in the selection of its Dealers. The Lee Dealer may not have the largest store, but he does have a good store. We make an effort to select the very best dealer we can get at each point. He must be a responsible business man, dependable and reliable in his business dealings.

Your Lee Dealer is a citizen and a taxpayer who is helping to build up your community. It is likely that he is your personal friend as well as business acquaintance. He is not "here today and gone tomorrow". He will be doing business in your town next week and next month and next year, and he will stand behind everything he sells you, especially Lee Remedies.

How much better it is to buy your poultry remedies from him rather than from some peddler who will try to load you up with as big a purchase of unknown remedies as he can and then never see you again. Why put your trust in a peddler whom you do not know and who expects to make only one sale to you?

Your Lee Dealer is not so much interested in the profit from one sale to you. He wants to help you so that you will be a regular customer, for Lee Remedies and other things, for years to come.

When a medicine is needed, it is often needed immediately. Your Lee Dealer performs a real service for you by keeping an assortment of Lee Remedies on hand at all times for you.

You will want to keep Germozone on hand for giving regularly to your birds, and it is good for you to have either Leemulsion or Vapo-Spray for immediate use at the first sign of a Cold or gasping. But it would be impractical for you to try to keep all of the Lee Products on hand. Your Lee Dealer does that for you. You can get them from him without having to send to the Lee Company, and with no delay.

Ask for Lee Remedies only at the store of your Lee Dealer. If you ask for a Lee Remedy at some other store, naturally the merchant will try to sell you something else claimed to be "just as good". Learn who your Lee Dealer is, then depend on him, call on him for help in all poultry troubles. And buy from him your Lee Remedies and all other things you can.

Give All Your Birds

GERMOZONE

The Liquid Drinking Water Medicine

Effective Antiseptic
Soothing Astringent

All birds are bound to get many germs on their beaks as they pick in litter or on the ground. Then those germs get washed off into the drinking water. In that way many of the germs that are passed out by one infected bird get *inside* the rest of the flock. And the same is true of germs carried into the poultry yard by the wind or on people's shoes or on the feet of animals. All of your birds, young and old, need reasonable protection against poultry diseases that are often spread through the drinking water. Germozone is given in the drink, and its first action is right there. It destroys many of the germs and bacteria IN THE DRINKING WATER.

If germs could get into your birds only through their drinking water, it would be enough protection to use something that would only purify the water. But that is not the case. They pick up germs from the ground or litter when they eat, too. Those germs go right into the crop. The way to protect your birds from those germs is to give your birds something that will act against germs *in the crop*. Ordi-

nary poultry drinking water tablets may purify the drinking water. As just mentioned, Germozone does that too. But the action of Germozone does not stop with the drinking fountain. When the Germozone water is drunk and goes into the bird's crop, the medicine acts against germs there, too. That is Germozone's second action, IN THE CROP.

Germozone is a Triple-Action medicine, and its third action is of great importance and gives Germozone much of its value. Even after the Germozone may have spent all of its own germ-killing power in the drinking fountain and in the bird's crop, it still acts as a medicine, and a very important medicine, when it gets back in the intestines. Much of the destructive work and harmful action of many disease germs takes place in the intestines. The bird's intestinal cells have a wonderful power of fighting and resisting the attacks of disease germs. Germozone greatly increases that power of the bird's own body, to destroy disease germs in the intestines. And it has an astringent, soothing action there. GERMOZONE ACTS **1st** IN THE DRINK, **2nd** IN THE CROP, AND **3rd** IN THE INTESTINES.

A LIQUID

Another good thing about Germozone is that it is a liquid. Most poultry raisers who have ever tried poultry drinking water tablets, have noticed how it takes time to get them dissolved and then to get the antiseptic evenly mixed all through the water. If one does not have the patience or time to wait for the tablet to dissolve, there may be too much of the antiseptic in one part of the fountain and almost plain water in another part. Just a swish with the spoon, or turning your fountain upright, is enough to make Germozone mix evenly through the water so that each bird gets just the right concentration.

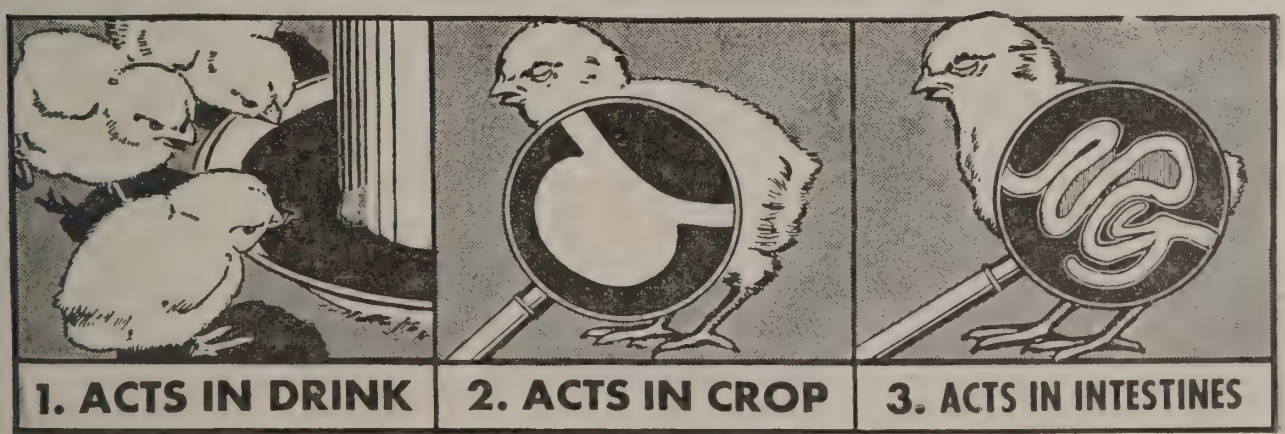
When Your Birds Need Germozone GET GERMOZONE

As we have pointed out, there is a big difference between Germozone and many poultry drinking water tablets and ordinary drinking water disinfectants. Don't just go into a store and ask for "something to put in the drinking water". Ask for Germozone, and do not accept something that will not give your birds the Triple-Action protection and help that Germozone will give them. Ask for Germozone, and in order to get Germozone go to your Lee Dealer for it.

How to Use GERMOZONE *effectively* FOR BABY CHICKS

Chicks should be given Germozone in all drinking water for the first three weeks, in the proportion of one teaspoonful to each quart of drinking water.

After the first three weeks and so long



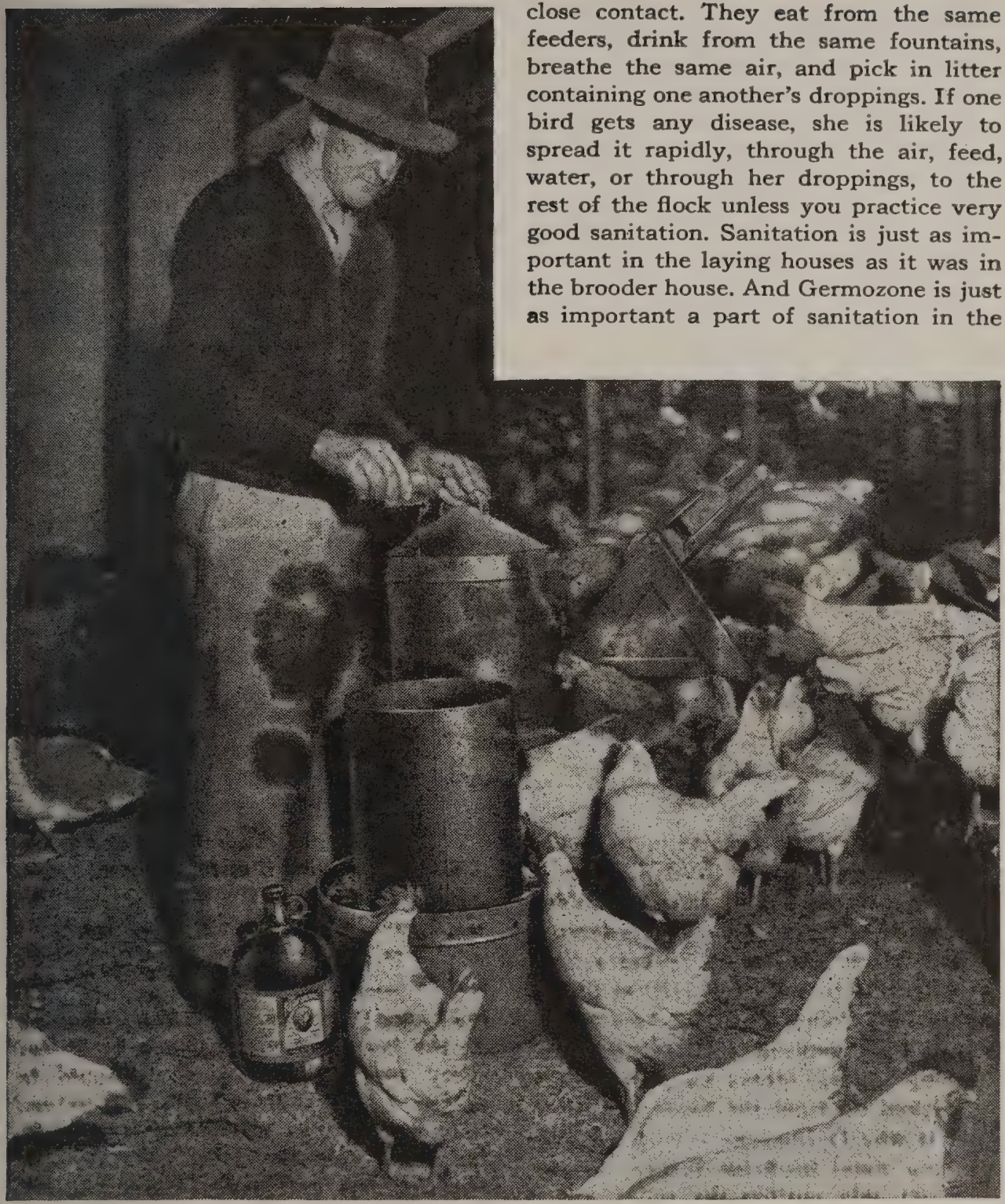
as the chicks are well, it will be enough to give them Germozone, in that proportion, in only one drink each day—say, when you fill the fountains in the morning. This should be continued until the young birds are put out on range.

What About GERMOZONE

For Birds On Range

After chicks are carried through the critical brooding period successfully, they are introduced to larger quarters or put on range. Not all danger of bacterial infection is over, and if present it is good to continue Germozone in one drink each day, or in all drinking water two days each week. A specific case where such precautions are necessary would be where the growing chicks have even occasional contact with older stock. Remember also that at this time the birds are more likely to feed on dead birds or animals and to drink from dirty puddles. One of the necessary precautions is to have Germozone on hand to help care for cases of botulism that may appear.

This is also the time when greatest care must be taken to avoid loss from Coccidiosis. Probably most Germozone used during the growing period is given on alternate days with Acidox to care for birds showing symptoms of this disease. See pages 21-24.



close contact. They eat from the same feeders, drink from the same fountains, breathe the same air, and pick in litter containing one another's droppings. If one bird gets any disease, she is likely to spread it rapidly, through the air, feed, water, or through her droppings, to the rest of the flock unless you practice very good sanitation. Sanitation is just as important in the laying houses as it was in the brooder house. And Germozone is just as important a part of sanitation in the laying houses as it was in the brooder house.

GERMOZONE

For Layers

When your birds are put in the laying houses, they are thrown again into very

By all means give your layers Germozone. Every other day or twice a week is good, but because many diseases can get such a start in less than 48 or 72 hours, it is better to give it in one drink every day. And now that the birds are adult, they should get two tablespoonfuls of Germozone to the gallon of drinking water.

Germozone for Treating Roup

Because of rubber restrictions we can no longer supply our Poultry Nasal Syringe which has been so popular for treating Ocular Roup. As a substitute we suggest a method which was successfully used for 30 years prior to the invention of the Nasal Syringe. That method is as follows: Mix two tablespoonfuls of Germozone in a quart of warm water and place in a deep bowl. Mix fresh for every 25 or 30 birds. Hold the bird's feet with the left hand, and with its head hanging straight down, insert the first finger of your right hand in its mouth. In this position dip the head straight down in the Germozone solution until the eyes and mouth are fully submerged. As the head is submerged begin massaging around the eyes and nostrils and gently massage the cleft, or roof of the mouth. This massaging helps to force out the accumulated mucus and gets the solution up into the head. The bird's head can be held under as long as desired, if lifted out an instant every few seconds to get its breath.

GERMOZONE *for Turkeys*

FOR BABY POULTS. A great many poults are lost during the first week because of intestinal diseases and bowel troubles. Thousands of turkey raisers have learned to depend on Germozone to carry their young poults through this critical brooding period. Some of these diseases are caused by organisms that get into the drinking water,—others by germs which are picked up from the floors and litter. That is why Germozone is such an ideal drinking water medicine to use. Germozone not only purifies the water, but it works clear through the poult. See Germozone, pages 54 and 55.

FOR GROWING POULTS. Whether poults are reared on range or in batteries, bowel troubles often develop. Some of these troubles may be due to some slight irritation of the bowels, or, as more frequently happens, to some of the more serious infections, such as Blackhead, Trichomoniasis, or Coccidiosis. Germozone alone is very valuable in controlling or holding down the simple diarrheas, but in caring for poults with the more serious diseases just named, Acidox should also be used. For complete details read pages 68 and 69.

FOR ADULT TURKEYS. So much depends on the health of the breeding flock that every reasonable precaution should be taken to keep their vitality and natural resistance as high as possible. Low resistance of breeders means infertile eggs, poor hatches, and weak poults. The fact that breeders are usually on range often makes the regular use of Germozone impractical, but when possible it should be used. The Acidox-Germozone treatment does have a very definite place, however, in combatting many of the intestinal infections in old, as well as young birds. In any trouble where you are not sure of your diagnosis and there is evidence of bowel disturbance, it is advisable to use the Acidox-Germozone treatment.

GERMOZONE *for Livestock*

Germozone has so many uses on the farm that many farmers would not think of being without it. Some of Germozone's most enthusiastic boosters are farmers and stockmen who use it, not only for poultry, but for calves, lambs, and pigs. Such animals are often subject to a number of minor digestive upsets which cause scours, and Germozone is very valuable for such conditions.

SCOURS IN CALVES. Because Germozone has both an antiseptic and astringent effect, it is of great value for many forms of scours in calves. Use one tablespoonful added to one-half gallon of warm milk, about body temperature, and give morning and night.

FOR LAMBS. Scouring in lambs may result from eating poison plants, mouldy or frozen alfalfa, or such things as beet tops. One ounce of Germozone to each gallon of drinking water is often all that is necessary to stop the scours. Be sure the lambs get to no other water than that which contains Germozone.

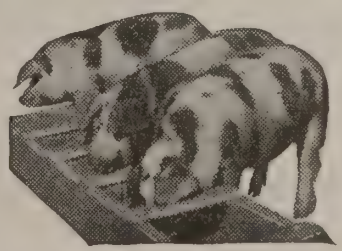
SCOURS IN PIGS. Pigs showing evidence of scouring should never be neglected. There are many things which may cause scours; many of them respond to treatment while others do not.

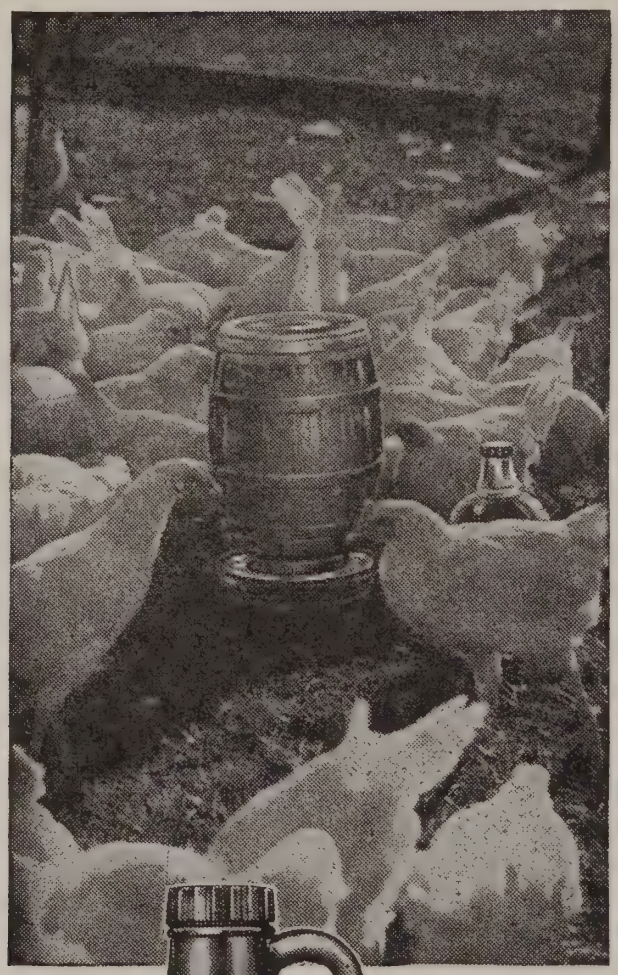
Germozone has proven very valuable in treating certain forms of scours. Thousands of hog raisers have used Germozone for this purpose with fine results. Pigs like Germozone too, and drink it readily.

In treating pigs affected with scours, the following should be carefully followed: First, shut pigs in a dry lot. (If a concrete floor is available they should be put on it, so that it can be cleaned and disinfected every day.) Feed only whole soaked oats with one quart of oil meal added to each bushel of oats—added dry when putting the soaked oats in feed trough.

Add salt to the evening feed using one handful to each bushel of oats. Keep pigs off pasture. Mix two tablespoonfuls Germozone in one gallon of water. (In larger quantities one pint to 15 gallons water.) Give this FIRST THING IN MORNING as a drink in CLEAN TROUGH, after having held pigs off feed and water all night. Do this daily for ten days. The feeding is important. One feed of corn or other material may set a pig back.

Since some forms of scours are infectious, the pen should be well cleaned every day and a good disinfectant such as Lee's Creosote Dip then used. The use of straw or other bedding will help to prevent the floors from becoming slick and mussy.





Save Money by Getting Enough GERMOZONE for Your Flock Requirements

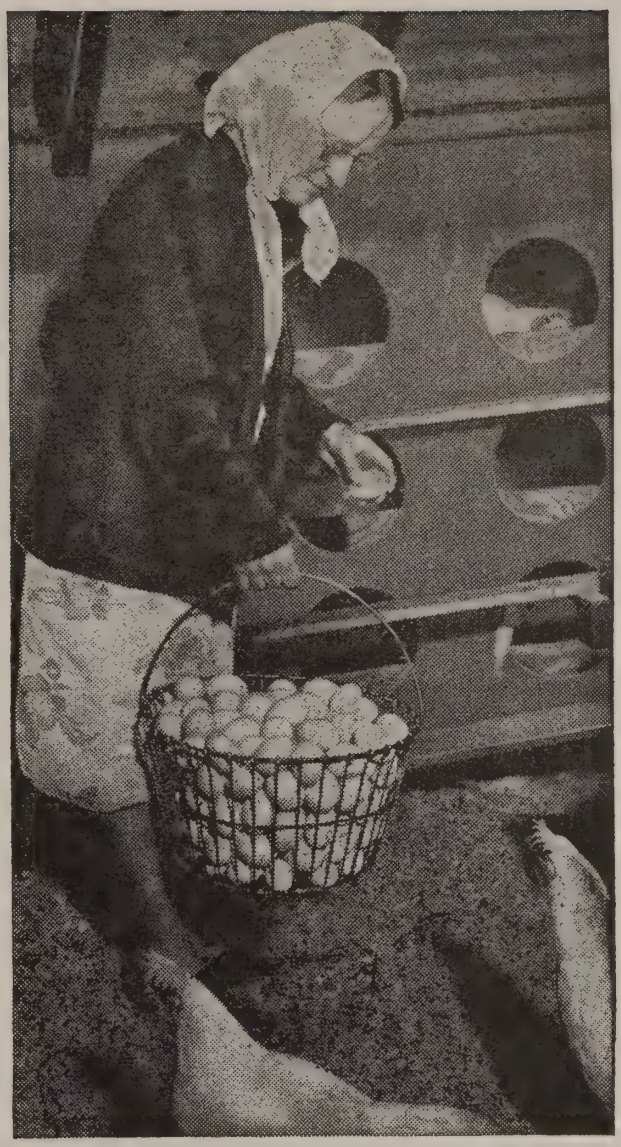
There are sound economic reasons why you can save money by selecting the larger sizes of most medicines. This is true for Germozone. A quart is more than twice as economical ounce for ounce as a small four ounce bottle. And the larger sizes are even more economical. It is to your advantage when you get your chicks to buy as much Germozone as they will probably need. We suggest *a quart* for *each 100 chicks.* This will carry them well through the growing period in most cases. The rule will hold in buying Germozone for older birds—one quart for each 100 unless there is trouble and you plan to give all of them Germozone every day for quite a while. Always buy in the largest, most economical size, you can.

For flocks of 50 to 100 chicks, it pays to buy Germozone in quarts. The medicine will last longer and costs less than half as much per ounce. But for smaller flocks, the 12-oz. size is generally advisable.

GERMOZONE
Comes in 5 Handy Sizes

128 oz.	64 oz.	32 oz.	12 oz.	4 oz.
$4.50	$2.50	$1.50	75c	40c

Why It Pays So Well To Worm Your Flock

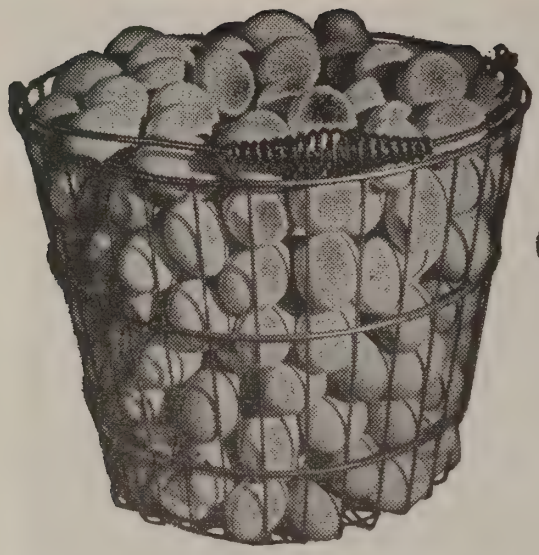


Worms not only cut down egg production, but they often hurt the birds' general health. They may lead to most any disease. And worms are just as harmful to growing birds as they are to laying birds. They cause the same damage to the intestines and rob the growing birds of feed, too. No chickens, young or old, are ever very profitable when they are filled with worms. Most flocks, unless wormed, have at least some worms.

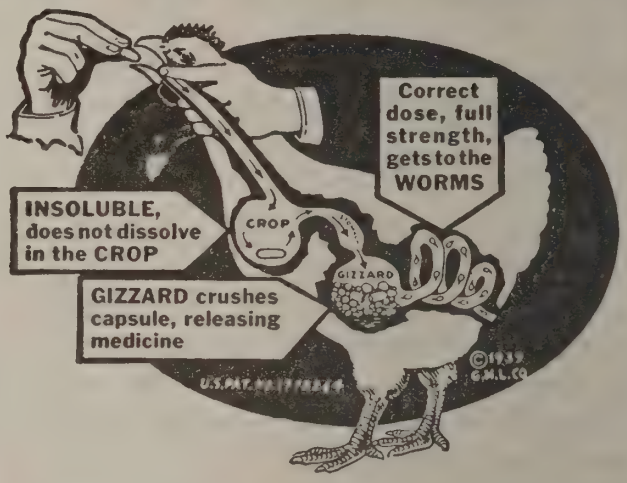
It does not pay to let worms get a head start. The regular use of Tonax, beginning when the chicks are six weeks of age and fed during the growing period, is very helpful in keeping down Round Worms. And Round Worms are the most common kind of worms in young growing birds. Tonax is easy to use as it is given in the mash, 1 pound to 100 pounds of mash. (See Tonax, page 65.)

Flock treatments are not satisfactory for Tape Worms. These worms are harder to remove than Round Worms and it is necessary to treat the birds individually for them. Gizzard Capsules are ideal for use then, as Gizzard Capsules are for all three kinds of worms; Large Round, Large Tape, and Pin Worms.

Where Tonax has been used regularly during the growing period it is seldom necessary to use Gizzard Capsules until the birds are about four months of age. If Tonax has not been used, Gizzard Capsules should be given at the latest when the birds are three months of age.



WORM WITH THE *Safe, Effective* GIZZARD CAPSULE



Gizzard Capsules Will Not Throw Birds Off Feed or Check Egg Production

Thousands of flock owners, who have used Gizzard Capsules have learned that here is one worm treatment which gives—

No Loss of Production

Through years of constant experiment and research we have learned how to combine drugs that do their work effectively and WITHOUT KNOCKING EGG PRODUCTION. Pullet flocks just starting to lay are sensitive to handling. Treat such birds with Gizzard Capsules before egg production begins.

No Upset, Sick Birds

It is not necessary any more to have a flock droop around after worming. These medicines work quickly—and then they pass out rapidly. To get this "flash action" and a good clean-out, give Gizzard Capsules on an empty crop.

Effective Results

The Gizzard Capsule removes Large Round Worms from chickens and turkeys. It not only desegments Large Tape Worms from chickens but it gets heads and all of every kind of Large Tape Worm that any product on the market can get. Also it removes the Large Turkey Tape Worm from turkeys—head and all. And its effectiveness against Pin Worms in both chickens and turkeys is good.

When and How to WORM

For best results Gizzard Capsules should be given in the morning when the crop is empty. Catch each bird and slip a capsule along the roof of the mouth. Push the capsule back in the throat with one finger, and place the bird gently on the ground. Shortly after treatment feed and water can be given.

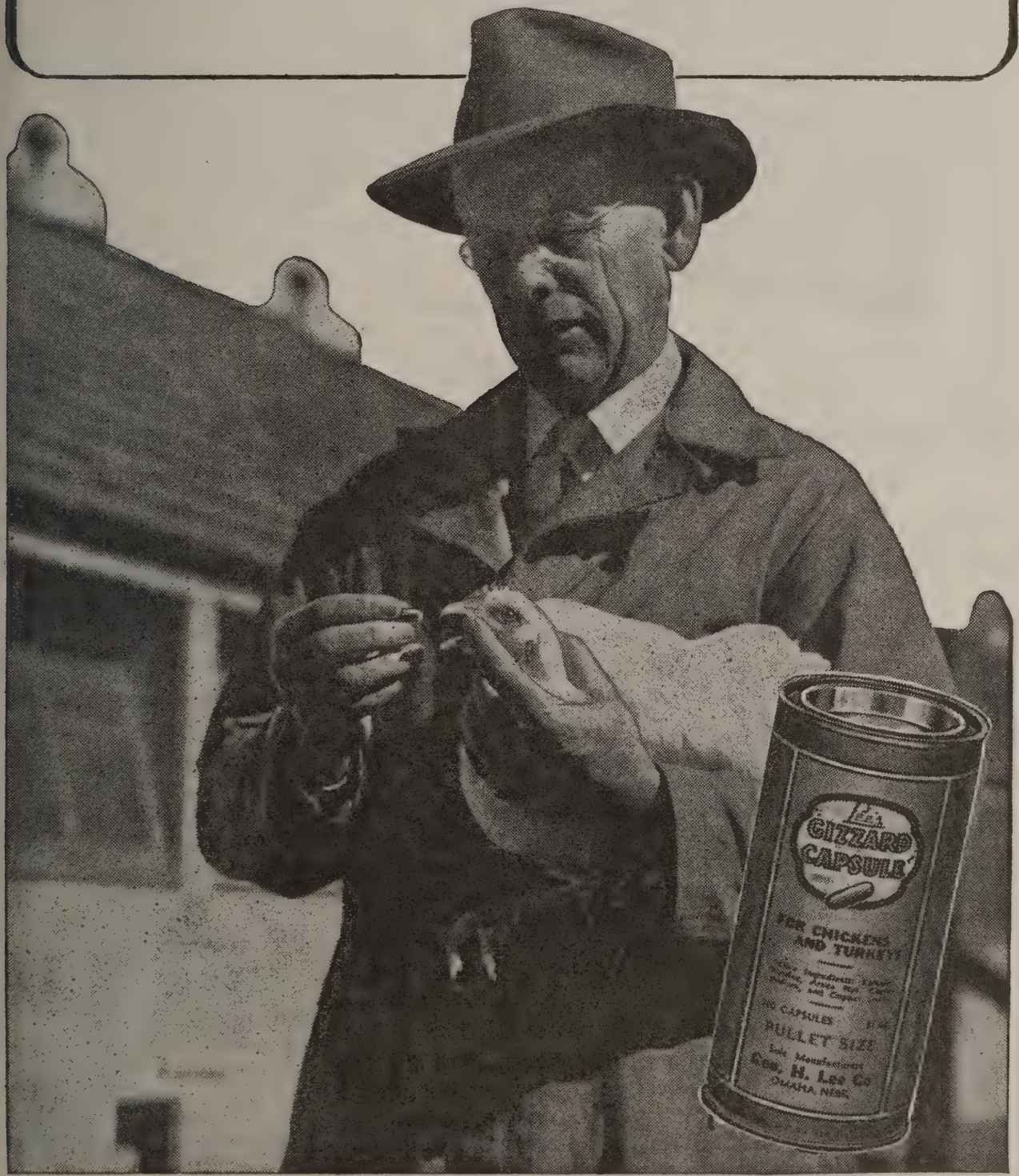
There are times when it may be necessary to worm young birds less than 3 months of age. The Chick Size Gizzard Capsules are usually safe for even 8 week old birds, but it is best to try them on only a few at first, to see how the chicks tolerate treatment.

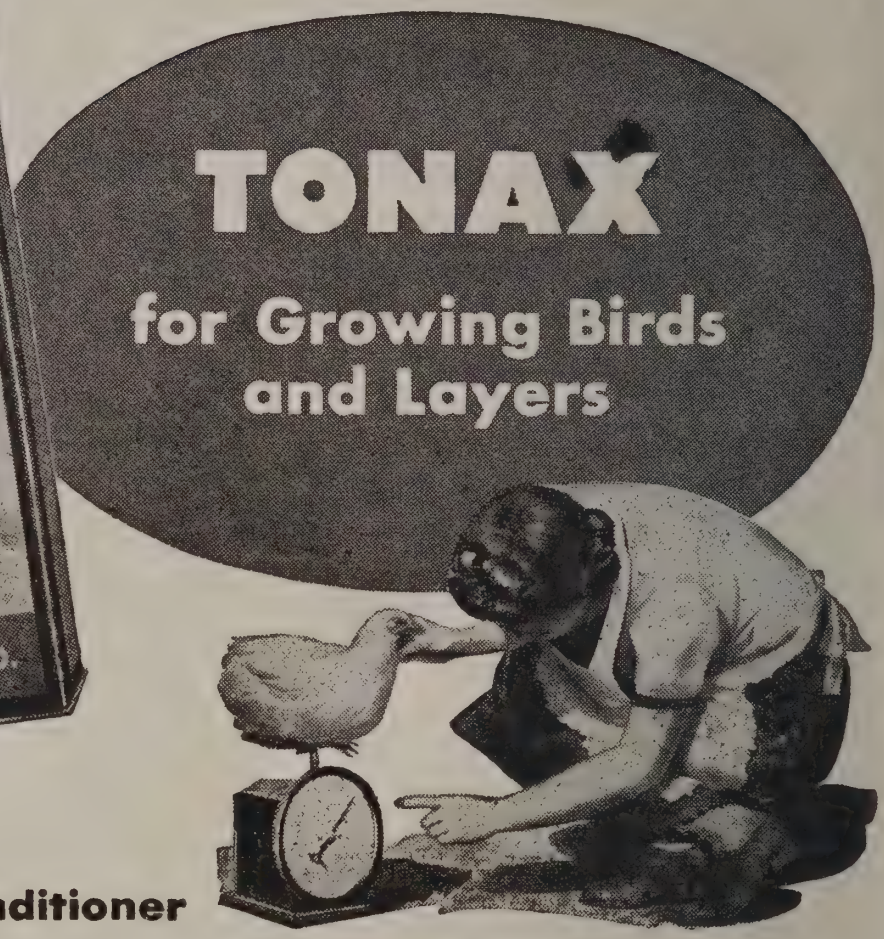
No poultry owner can afford to feed worms. It is always advisable to use Gizzard Capsules whenever worms are suspected. But worms often cause severe damage before they are noticed. Many poultrymen follow a systematic worm control program. Pullets are treated with Pullet Size Gizzard Capsules at 4 months of age, and with Adult Size Gizzard Capsules between 5 and 6 months of age. Hens kept over can be treated at the second worming and again in the late Spring.

Low Prices on GIZZARD CAPSULES

Make It Possible to Worm for ABOUT 1c PER BIRD

SIZE	1 Env. of 10	1 Can of 50	1 Can of 100
ADULT for birds 6 months and older	$0.15	$0.75	$1.25
PULLET for birds 4 to 6 months of age	.10	.50	1.00
CHICK for birds 3 to 4 months of age	.10	.40	.75





A Tonic and Conditioner Used in the Mash

Tonax will supply your growing birds with blood-building elements and trace minerals that they need. It will give them reliable stimulants which will help them along during the critical period when they should build up a natural resistance to many diseases. Tonax will provide them with good astringents which will help to relieve swollen, inflamed intestinal tissue. And it contains Nicotine, which is recognized as one of the best drugs for the control of Large Round Worms. By helping your birds to make more poultry meat, you will help win the war and you will make good profit.

Beginning when the chicks are 6 weeks of age, use one pound of TONAX well mixed in each 100 pounds of mash. Feed this all through the growing period and until the birds are 4 months of age.

Here's What TONAX Contains

ASTRINGENTS. These are most important for relieving congestion and healing the inflamed lining of the intestines. The thick slime so commonly found in the intestines results from Enteritis.

BLOOD BUILDING ELEMENTS. Manganese, Iron, Cobalt and Copper. These elements are vitally essential, but they are deficient in many diets. They are necessary for good health.

DRUGS FOR PARASITE CONTROL. Not just tobacco powder but a combination of Nicotine, Pyridine, and Sulphur. All of these act against intestinal parasites, especially young round worms, when used as a control.

STIMULANTS. Tonax contains the most reliable stimulants yet discovered. These make it valuable as a tonic.

For Growing Birds

Each drug in Tonax has been selected for a definite purpose. This combination of drugs makes Tonax ideally adaptable for year-round use.

Broiler men report fine satisfaction after using Tonax. Poultry raisers tell of steady growth and weight maintenance. Many flock owners say that Tonax helps to carry their flocks through the heavy laying season in fine shape. Try Tonax. You will like it.

Help Laying Hens Keep in Condition with TONAX

A laying hen must convert the food she eats into eggs. That is quite a drain on her system if she is a good producer. And only a good producer is profitable. Every bit of food must first be changed in the intestines so that it can be taken up by the blood. It is then carried through the blood stream to the respective organs. A part of that food is used by the hen to keep up her system, but if she is a good layer the greater part of feed is used to manufacture the eggs. In other words she must take the raw material (which is feed) and manufacture it into eggs. A hen therefore can be likened to a small complicated machine and, like any other complicated machine, every working part must be functioning perfectly. If any one part fails to work properly, the entire machine is hindered, or fails entirely.

Tonax is very helpful to laying flocks. It helps to keep the bird's system working properly.

Tonax helps to stimulate intestinal activity and in that way helps the birds to

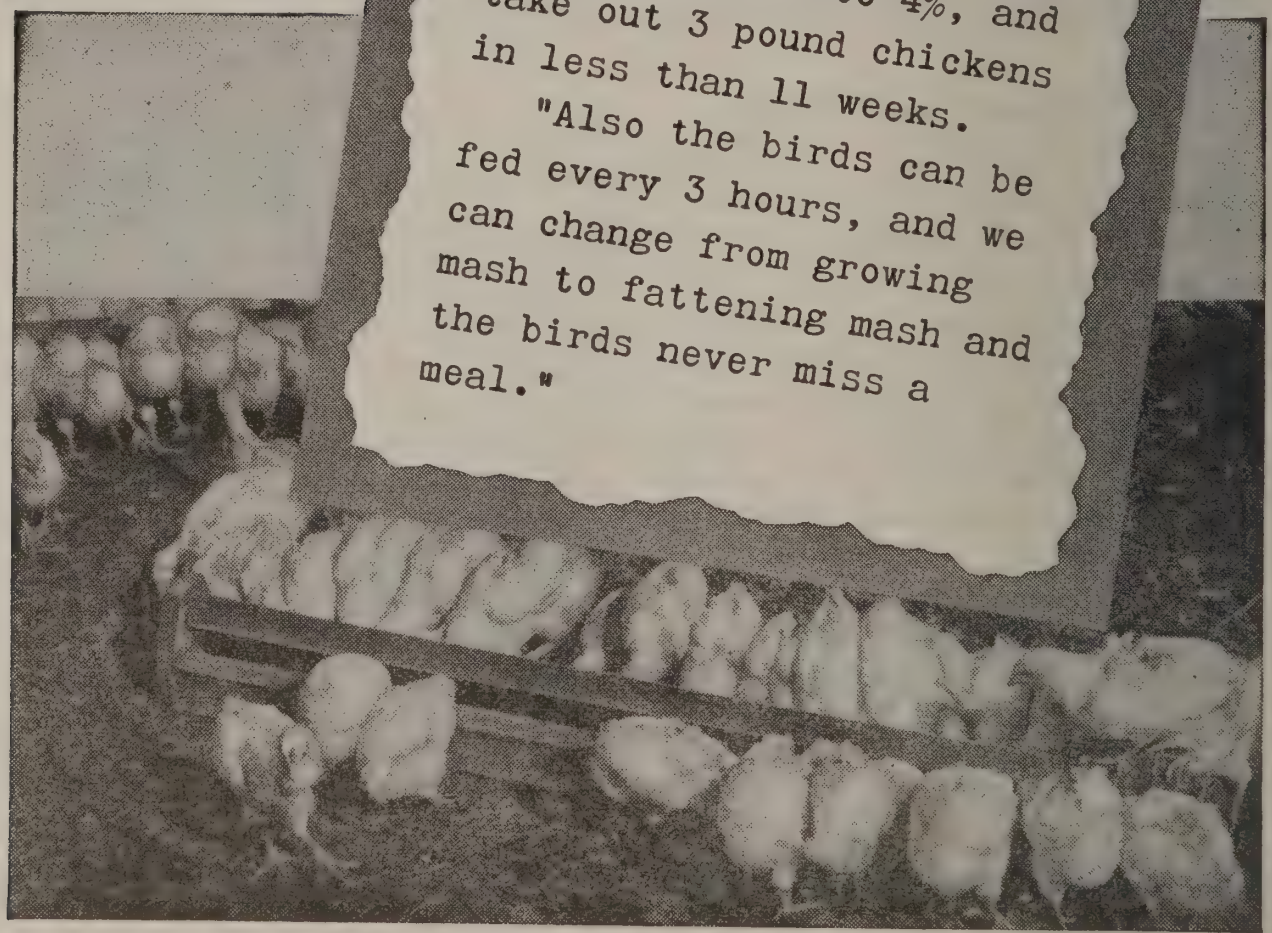
handle their food. It furnishes important trace minerals which are so necessary to both health and egg production, and the stimulants which it contains are valuable in keeping the bird's system toned up. Tonax is not a feed, nor does it contain any "fillers". It is 100% active ingredients, each of which serves a definite purpose.

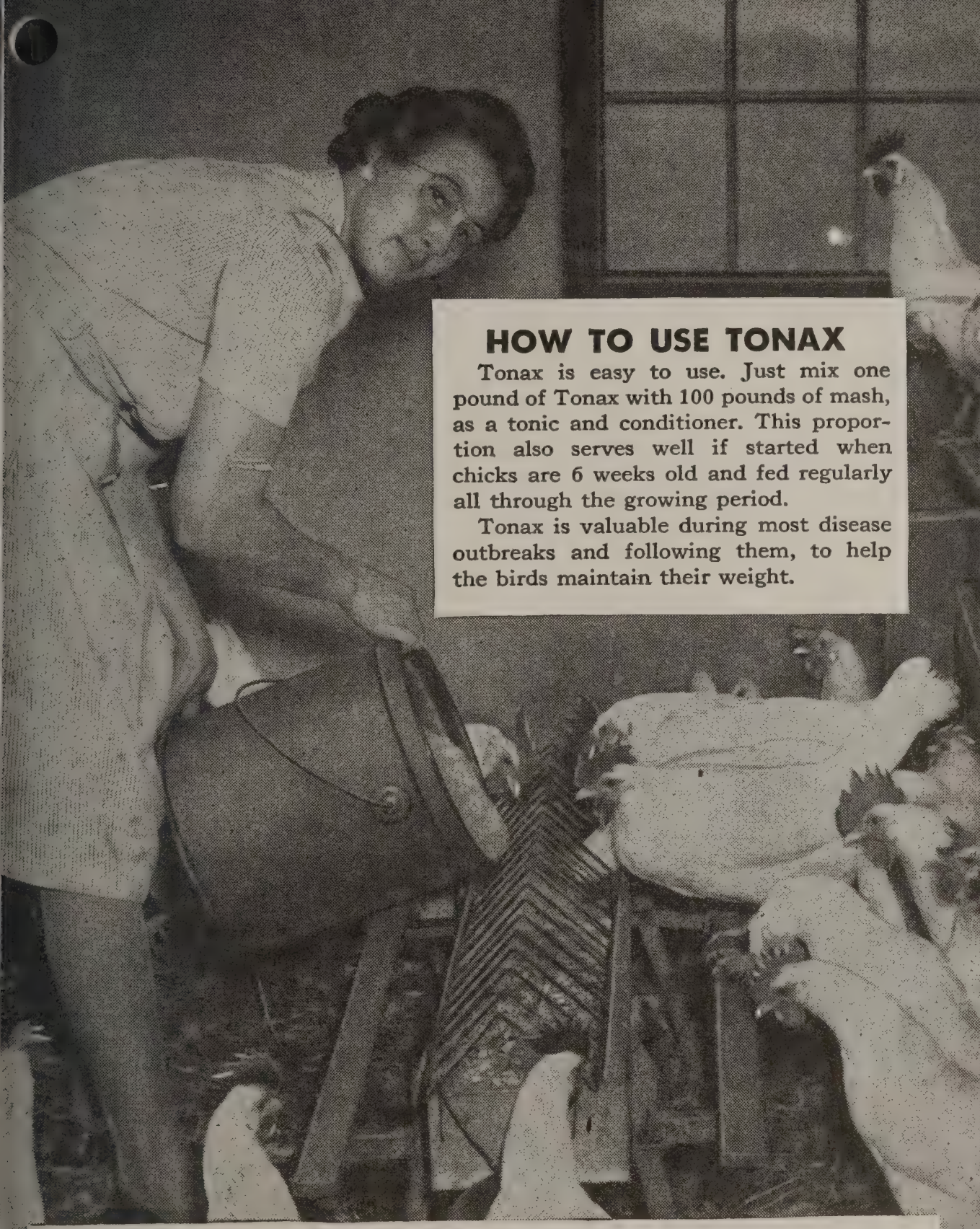
What the poultry raiser desires above all else, is steady growth or weight maintenance, without the set-backs that occur so frequently after colds and other common sicknesses and troubles that birds "get over" but which too often leave their effect. The regular use of Tonax during such troubles often helps the birds to maintain weight and to keep the birds happy and alert.

Broiler Raisers Tell Us:

"With the regular use of Tonax fed in the proportion of 1 pound of Tonax to 100 pounds of mash, we hold our losses in the batteries down to 4%, and take out 3 pound chickens in less than 11 weeks.

"Also the birds can be fed every 3 hours, and we can change from growing mash to fattening mash and the birds never miss a meal."





HOW TO USE TONAX

Tonax is easy to use. Just mix one pound of Tonax with 100 pounds of mash, as a tonic and conditioner. This proportion also serves well if started when chicks are 6 weeks old and fed regularly all through the growing period.

Tonax is valuable during most disease outbreaks and following them, to help the birds maintain their weight.

SIZE OF PACKAGE	ENOUGH FOR* CHICKS 1 to 6 WKS. inclusive	HALF GROWN 7 to 18 WKS. inclusive	ADULTS Per month	PRICE
12-oz.	40	10		$ .30
2-lb.	100	16	60	.75
6-lb.	300	50	180	2.00
25-lbs.	1,250	200	750	7.50
50-lbs.	2,500	400	1,500	14.00
100-lbs.	5,000	800	3,000	25.00

*These estimates based on 50% grain ration after 8th week.

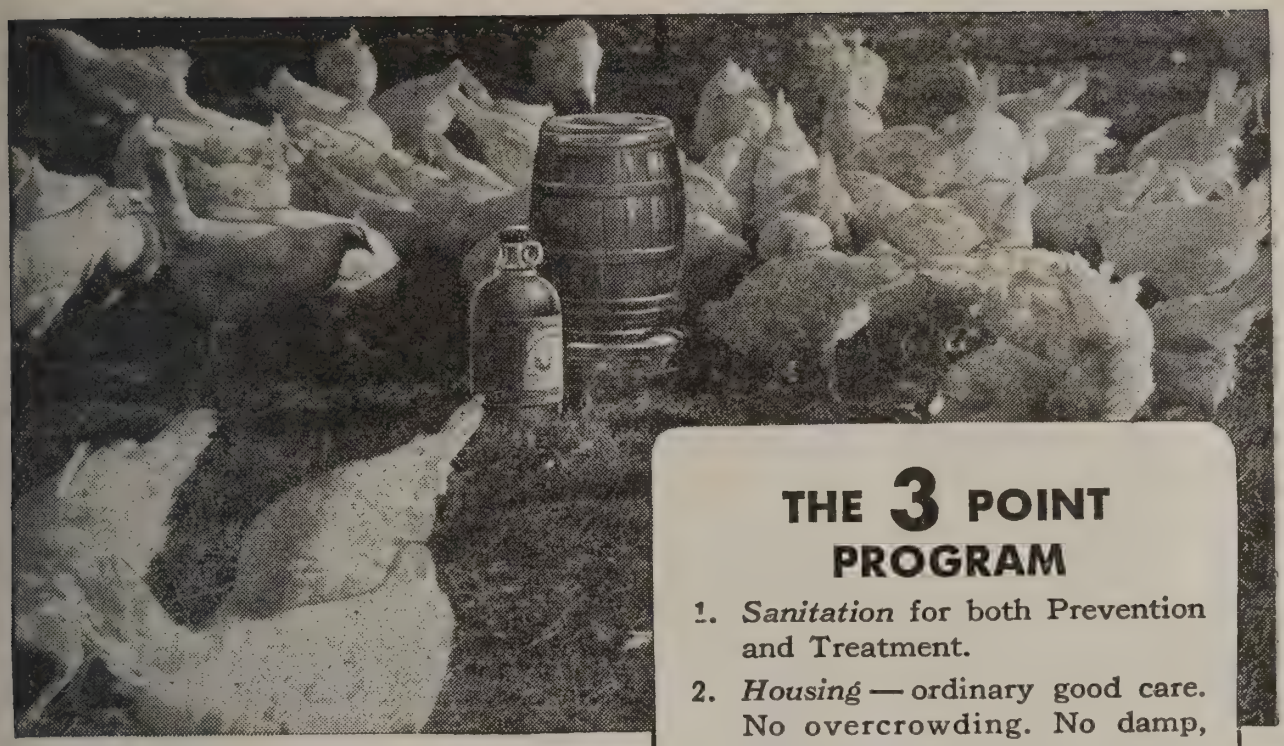
Use ACIDOX and GERMOZONE

In the Care of Birds with COCCIDIOSIS!

Any one who has had a serious outbreak of Coccidiosis in his flock knows how bad it is. The "bloody" form of Coccidiosis often causes a very heavy death loss, but other forms that do not show blood in the droppings, are just as costly. In bad attacks of Coccidiosis the lining of the intestines is severely damaged; sometimes so badly that there is bleeding.

It is easy to see why birds suffering from Coccidiosis lose so much weight. Many of those birds are actually starving. Sometimes they cannot absorb enough food through the badly damaged lining of their intestines to even live; let alone holding their weight. That is why it is so important when handling an outbreak of Coccidiosis, to know that it will not make matters worse by throwing the birds off feed, instead of making them better.

Strong, *uncontrolled* acids have long been used for Coccidiosis, but they nearly always threw the birds off feed, at the very time when the poor birds needed all the nourishment they could get. What the birds need is something that will encourage normal food consumption.



That is one great reason why the Acidox-Germozone Treatment has become so popular. Acidox is a *controlled* acid which *does not* throw the birds off feed. They like it. Probably most loss in Coccidiosis results from failure to make proper use of feed. Acidox helps the birds do just that. Then nature replaces the destroyed tissue with new cells *which are immune to Coccidiosis.* And your one object should be to bring your birds through the attack until they *can* establish *such an immunity.* In this Germozone is also of great value. Its astringent, soothing action helps to relieve the inflammation in the intestines, and in addition to this it has a beneficial action against other disease germs that frequently accompany Coccidia.

HOW TO USE

Both Acidox and Germozone are easy to use and can be used in any kind of a drinking fountain. Just add one tablespoonful of Acidox to each gallon of drinking water *every other day.* On days when Acidox is not used, add one tablespoonful of Germozone to each gallon of drinking water. Continue this treatment for two weeks. This gives the birds seven days of treatment with each medicine.

THE 3 POINT PROGRAM

1. *Sanitation* for both Prevention and Treatment.
2. *Housing* — ordinary good care. No overcrowding. No damp, drafty or cold quarters.
3. *Medicine* — Germozone every other day, and Acidox on days when Germozone is not given, until the chicks have had 7 days of each, 14 days of the two. Same dose for each medicine, one tablespoonful to each gallon of drinking water. Both Germozone and Acidox can be given in any kind of a drinking fountain.

COST OF ACIDOX

A little Acidox goes a long way. The following estimates are based on average water consumption for the two weeks of treatment.

	Birds 6 Weeks Old	Birds 10 Weeks Old	Cost
4-oz. for	100	50	$ .50
12-oz. for	300	150	1.00
32-oz. for	800	400	2.00
½ gal. for	1,600	800	3.50
1 gal. for	3,200	1,600	6.50

Diseases of the air passages are likely to be very costly, if they are neglected. Never neglect even what may appear to be only a minor trouble. You never know when it may flare up, if neglected, and cause heavy losses. Chicks frequently develop symptoms of Colds or Gasping. And troubles of the air passages are very common in growing and adult birds. Either Leemulsion or Vapo-Spray will give fine results. In adult birds, and in severe cases, both are recommended.

Stir LEEMULSION into the drinking water every day for three days. Use only a level tablespoonful to each gallon of water, and stir thoroughly. Leemulsion mixes with the water and helps to disinfect *all* of it—not just the top surface as many oils do. When birds drink, their beaks get coated with an oily film which helps to prevent infection. Part of the oil works up into the air passages. Leemulsion soothes and reduces irritation—works much like a good cough medicine on humans. For use with chicks see page 72.

OTHER PRECAUTIONS

A laxative may be helpful where a large part of the flock seems listless or shows outward symptoms. See page 47 for directions to be followed.

Dampness and drafts contribute to the development and spread of colds and bronchitis. Take measures to provide dry quarters and litter when necessary. Cross drafts can be eliminated best by having open windows on only one side of the poultry house.

Colds, Wheezing, Gasping and VAPO-SPRAY

Spray in Air over heads of Birds

LEEMULSION in the Mash

Many poultrymen still like to add Leemulsion to the mash instead of using it in the drinking water. It can be conveniently used by first stirring the medicine into water or milk, and then pouring the solution on the dry mash. A little mixing will give a crumbly, palatable feed. Specific directions will be found on the Leemulsion label.

Treat the Whole Flock with VAPO-SPRAY

Because of the highly contagious nature of most diseases of the air passages, treatment of individuals is of little use. The whole flock must be protected.

HOW TO USE

The first step to be taken is the prompt use of VAPO-SPRAY. Use a sprayer that gives a fine mist, and direct it over the heads of the fowls. Continue light spraying for about five minutes. The fowls should cough and shake their heads vigorously—that is part of the beneficial effect of the Vapo-Spray. At least three treatments should be given every day until the trouble clears up.

VAPO-SPRAY is a combination of healing oils and expectorants. Both its antiseptic and inhalant properties are valuable. It is sprayed in the air of the poultry house until a light mist is created. The beneficial oils are breathed by the fowls and volatile portions work gently through the air passages.

All forms of bronchitis should receive immediate treatment with both Leemulsion and Vapo-Spray. Prompt action is urgent. Laryngotracheitis should be treated with Vapo-Spray and Leemulsion even if the fowls have been vaccinated.

How to use LEEMULSION for baby chicks

Diseases of the Air Passages in Chicks

Chicks are very subject to breathing troubles. These troubles usually appear between the time they are hacthed and four weeks of age.

BRONCHITIS in chicks is quite common. The chicks gasp for air, stretching the neck like the thumbnail sketch above. Bronchitis is caused by a specific virus and is very contagious. This disease usually spreads quite rapidly. See page 10.

CHILLING results from too sudden or too great a change in temperature from that which is normal for chicks. Too much heat will cause as much trouble as not enough heat. Floor drafts should be avoided as well as overcrowding. See Brooder Pneumonia, page 11.

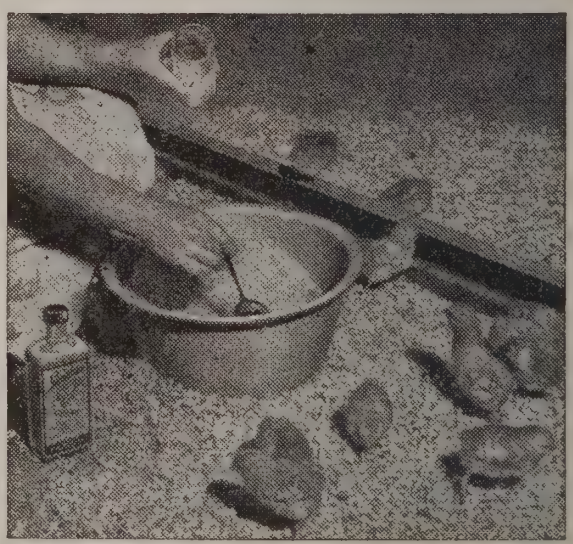
PNEUMONIA is a general name used where the lungs are affected. Chilling, overheating, molds, Pullorum, and Bronchitis, are the most common causes. Normally the lungs are salmon-pink in color. In Pneumonia they may vary from a bright red to dark red in color. See Brooder Pneumonia, page 11.

WHAT TO DO

Comfort of the chicks is the first consideration in all cases. Raise the temperature of the brooder house about five degrees. It is safe to have the air three inches off the floor under the hover at a temperature of 95° F in treating respiratory troubles. Some operators even use 100° F if the chicks have access to a cooler area away from the brooder stove. Use Leemulsion in the drinking water or mash.

LEEMULSION in the Mash. Use of Leemulsion in the feed instead of the drinking water is often preferred. A level tablespoonful stirred into a quart of water or milk can be used to moisten 5 pounds (a gallon by volume) of mash.

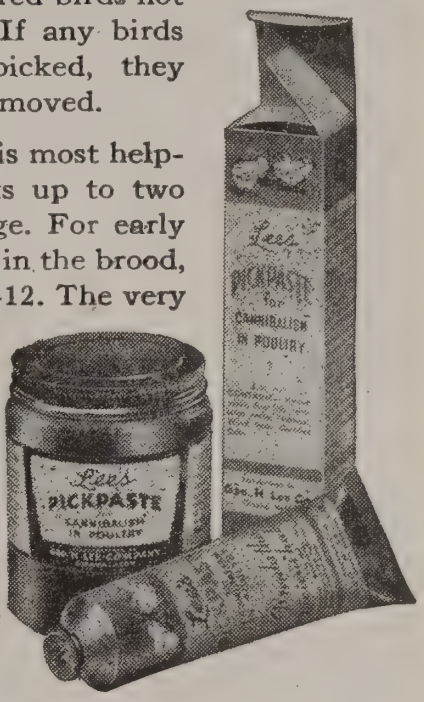
This method provides a semi-moist mash with the elimination of any irritating dust, and is recommended for all chicks under five weeks of age. Germozone can be used in the drinking water when Leemulsion is used in the mash.



PICKPASTE *for Cannibalism*

Pickpaste is a blood-colored preparation which is repulsive to fowls. A few tastes of it usually teaches birds not to pick at one another, unless the habit has become firmly established. It is antiseptic and protects the wounds from dirt.

At the first indication of picking, act promptly. Apply Pickpaste to any slight wounds. Then put a few daubs of Pickpaste on the wings and backs of 15 or 20 of each hundred birds not yet injured. If any birds are badly picked, they should be removed.

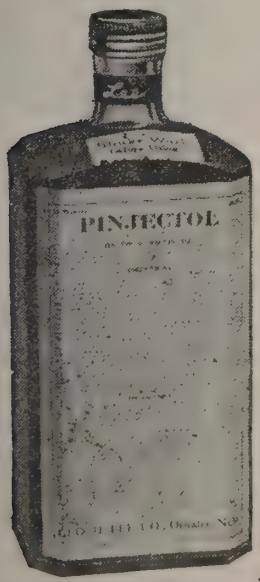


Pickpaste is most helpful for chicks up to two months of age. For early Cannibalism in the brood, see pages 11-12. The very serious adult Cannibalism in pullets starting to lay is described on pages 41-42. Pickpaste has some value for this condition, but drastic management change is often necessary.

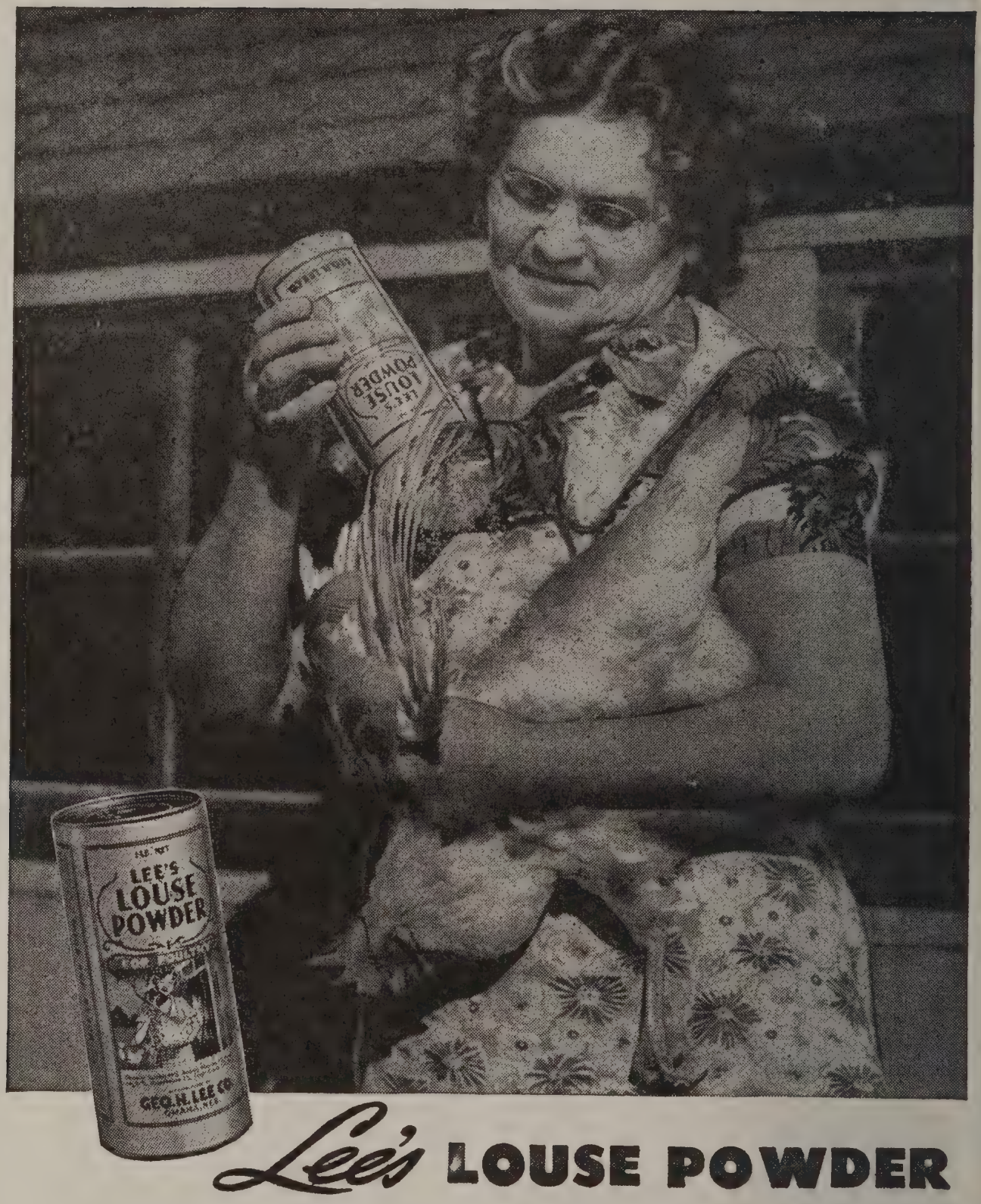
PINJECTOL

For Pin Worms and Blackhead

Pinjectol is used almost exclusively for turkeys. Pin worms have much to do with the spread of Blackhead. A large part of the value of Pinjectol is its value in controlling these worms. But Pinjectol is also deadly to the germ of Blackhead, and many turkey raisers have successfully brought back to health with Pinjectol birds that were sick with Blackhead.



Pinjectol is administered by rectal injection. Use an "infant syringe" (which is sold by druggists) with a nozzle 1½ to 2 inches in length. About a half ounce (a tablespoonful) per bird is necessary at two months of age, and about one ounce (two tablespoonfuls) at 5 months. A little experience makes dosing easy, but rectal injection must always be done gently. Hold the bird upside down for treatment. Insert the syringe as far as it will go easily. Squeeze the bulb containing the medicine gently but firmly. Continue to hold the bird in the same position for about 30 seconds after completing injection.



Lee's LOUSE POWDER

Lee's Louse Powder contains an unusually high percentage of active ingredients —Naphthalin, Sulphur and Sodium Fluoride—with just enough talc to keep it from being too strong.

For individual treatment of birds in small flocks, Lee's Louse Powder is convenient and economical. It takes more work than just painting Lee's Perch Paint on the roostpoles, but it costs only a trifle. And Lee's Louse Powder is very effective and dependable — even in cold weather when no Nicotine product can do its best work. Good for setting hens. Keep a can of Lee's Louse Powder handy. One lb. can, 25c; 2½ lb. can, 50c.

Lee's PERCH PAINT

For Body Lice and Feather Mites

A Nicotine Product Painted on Roosts

Perch Paint has a special base which locks the Nicotine in until the heat of the bird's body unlocks it. This keeps the Nicotine from being wasted when the birds are not on the roosts, and makes it go much further. And because that base is such that the lime in the droppings cannot release the Nicotine, no special scraping or cleaning of the roostpoles is necessary to keep the Nicotine from being wasted when the birds are not there. That special base of Perch Paint not only holds the Nicotine in when the birds are not roosting, but when their body heat unlocks the Nicotine to kill lice by fumigation, then the base itself also fumigates the lice.

No other roost paint has these features. Be sure to ask for Lee's Perch Paint, and in order to get it ask your Lee Dealer for it.

Directions for Use

Pour some Perch Paint into a dry can or cup. With a small, dry brush, paint top of perches about twenty minutes before birds go to roost. If roosts have fairly flat upper surface an oil can spout can be used for application, instead of brush. One ounce of Lee's Perch Paint is enough for 12 to 15 feet of perches.

PERCH PAINT SIZES AND PRICES

	Feet of Perches	
½ Pint Can	100-125	$0.85
Pint Can	200-250	1.50
Quart Can	400-500	2.50

BLITSPRAY

for External Parasites

For POULTRY LICE—Spray *directly on the birds* after they have gone to roost. Always use a fairly *coarse* spray to get liquid droplets on feathers of back and wings. By using a small pressure sprayer, a large number of birds can be treated in a fraction of the time required by other methods. Blitspray contains fumigants to drive the lice to the surface of the feathers, and contact insecticides to kill them. Hence a fine mist is *not* desirable. One ounce of Blitspray will treat fifteen birds.

Blitspray is useful in many cases where the housing arrangement is not adapted to painting roosts with Perch Paint. It is also suitable for use during cold weather. When properly sprayed, one treatment will often give satisfactory control of heavy lice infestation. If necessary, repeat treatment in two weeks.

Do not use Blitspray on birds under three months of age, or on flocks not roosting. A few birds on the floor will not be harmed if some ventilation is provided.

For FLEAS on DOGS—Spray the animal and bedding lightly in the morning. Repeat as necessary at weekly intervals. Blitspray can also be applied by moistening a small cloth with it and rubbing this over infested areas. Even with insecticides of equal efficiency owners notice degrees of difference in comfort to their dog. The reason for this is not completely understood, but we know that many dog owners have been well pleased with the total results obtained by using Blitspray.

For LICE on STOCK—Spray infested parts lightly in the morning with a hand sprayer. Repeat treatment in one week. Blitspray will control biting lice on stock, but is not recommended as a complete control for sucking lice on animals with heavy hair. For thin haired animals like hogs it can be used to good advantage. Sizes and Prices Page 80.

Go after Mites and Blue Bugs

WITH

Lee's MITE KILLER

FORMERLY LEE'S LICE KILLER

NOW—

EASY TO SPRAY
NO BLACK STAIN
PENETRATES FAST

How to *fight* poultry house Mites and Blue Bugs (Fowl Ticks)

FOR POULTRY HOUSE MITES

Spray Lee's Mite Killer liberally into all cracks, crevices, and joints of walls, roosting places and nest boxes. A forced spray pump is best for this purpose. Do this about an hour or more before letting the poultry back into the house. Lee's Mite Killer is very penetrating. It works into the hiding places of mites and kills them by contact. It may be diluted with fuel oil or crankcase oil for killing mites. Even diluted with crankcase oil, distillate, or other oils, it disinfects without making the poultry house damp. Don't let mites sap the vitality of your flock. Two good applications of Lee's Mite Killer a year will control mites.

BLUE BUGS

In the South Blue Bugs are as much of a pest in poultry houses as mites are up North. For Blue Bugs spray the entire house inside and up to about three feet on the outside with Lee's Mite Killer diluted according to directions.

Blue Bugs require *persistent* treatment. These parasites are large, multiply rapidly, and suck blood. Constant effort to keep them down is well repaid in flock health.

LEE'S MITE KILLER PRICES

1 Quart Can	$0.60
½ Gal. Can	.90
1 Gal. Can	1.50
5 Gal. Can	6.00

HOG OIL WORMER

No hog raiser need be told about the damage which Large Round Worms will cause. He knows that not only is the feed wasted that goes into wormy pigs, but that worms lower their resistance, and that within a short time he will probably have a bunch of runty, pot-bellied pigs or shoats on his hands.

PIGS SHOULD BE WORMED EARLY. Never wait until your pigs show signs of worms. By that time so much damage has often been done to the intestines, liver and lungs that the animals will not pay for the feed to get them on the market. Clean the worms out before they get a good start. About ten weeks of age is a good time to worm.

USE LEE'S HOG OIL WORMER. Lee's Hog Oil Wormer is made of time-tried and tested medicines which have been proved to be the most effective for removing Large Round Worms. It is easy to give, and is economical and safe.

HOW TO USE. Best results will be had by giving any hog worm medicine on an empty stomach. Keep pigs or shoats off feed for 10 hours before dosing. Then have the person who will hold the pig, catch it, setting the pig in an upright position, holding it by the front legs, and with its back against the helper's knees. Draw up a dose of Lee's Hog Oil Wormer into the syringe. Then place the thumb of one hand on the pig's throat; with the other hand insert the nozzle of the syringe in the side of the pig's mouth, so that the nozzle is well back on the tongue. Push down on the plunger slowly. As long as your thumb feels the pig swallowing, keep on pushing the plunger. If the pig stops swallowing, you stop. You can start it swallowing again by moving your thumb up and down on its throat. After the medicine is given let the pig down. That is all there is to it.

SAFE TO USE. Lee's Hog Oil Wormer is exceptionally safe to use. It cannot stick in the throat, like capsules, and therefore the danger of medicine remaining in the "blind pocket" of the throat to cause an irritation is eliminated. Then too, Lee's Hog Oil Wormer contains antiseptics which help to heal the irritation in the intestines caused by worms. It is very easy to give. Any hog raiser, with one helper can give it. Nothing will pay better returns than keeping worms out of your hogs.

DOSAGE. Three-fourths of an ounce for pigs weighing 40 pounds; less for smaller pigs. One ounce for pigs weighing 70-75 pounds, 1¼ ounces to heavier hogs. Runts should get the same dosage as other pigs of same litter.

SIZES AND PRICES

	No. of Doses (40 lb. pigs)	Price	Price Per Dose
1 quart	42	$2.00	4.7c
¼ gallon	85	3.50	4.1c
1 gallon	170	6.75	3.9c

LEE'S CREOSOTE DIP

PHENOL COEFFICIENT 5.

A good dip and disinfectant is one of the most valuable helps the farmer or poultryman can have in keeping down disease. It must be a GOOD disinfectant,—not just one with a pleasant odor, but one that will actually KILL GERMS. Lee's Creosote Dip *is* one that you can depend on. As a matter of fact it is 5 times more powerful in germ killing power than pure Carbolic Acid. This Dip and Disinfectant is especially valuable for disinfecting brooder houses, laying houses, hog houses, barns and for household purposes.

Due to war conditions we are unable to supply Lee's Dip in retail sizes. Your dealer may be able to fill your needs from bulk containers.

Lee's

DRI-RUB

For Poultry, Hogs and other Livestock

Lee's Dri-Rub is a strong insect repellent, and for many external parasites an insect killer. It helps give a fresh air of cleanliness often hard to obtain in poultry and livestock quarters. Because it is so inexpensive, it can be used freely in nest, dust boxes, and litter for poultry. And it has similar uses for other stock. It is based on naphthalene, creosote oil, and a very finely divided sulphur. The micronized sulphur in it has particles twenty-five times smaller than ordinary sulphur flour. This makes Lee's Dri-Rub considerably more effective.

FOR HOGS. Dri-Rub is important in controlling hog lice. The hog louse is one of the largest and most loathesome of all lice. Dri-Rub should be sprinkled on the animal and rubbed in, especially around the ears. Sprinkle it in the bedding too.

RABBIT HUTCHES. After cleaning rabbit hutches, you can deodorize them easily by sprinkling Dri-Rub about, in corners cracks and nests.

FOR CATTLE and HORSES. Dri-Rub can be used freely as a louse powder for cattle and horses. It is safe even under conditions of dampness, a fact not true for powders containing sodium fluoride.

FOR SEEDS. Dri-Rub has been found useful for protecting seeds from insects. In corn planting, a generous handful is placed on top of the seed after filling the planter box.

SOIL PESTS. Grubs, beetles, and the like can often be discouraged by using 2 pounds of Dri-Rub to each 100 square feet of soil (plot 10 feet by 10 feet). Sprinkle on evenly before spading.

FOR FLEAS. Dri-Rub is extremely useful in caring for large dogs in kennels. It can be used on the animals and in the bedding. This is an important feature because fleas, unlike lice, spend much of the life cycle off the animal. That is why it is easy to get fleas off a dog, but hard to keep them off. Dri-Rub helps for both.

In some parts of the country, as in the South, other fleas besides the common dog flea may become pests. It is necessary to get at the breeding place, often dusty soil under a building, to conquer these parasites. Sprinkle on about one pound of Dri-Rub for about 25 square feet of area (a space 5 feet square), and rake in a little for best results. Dri-Rub can also be used on the floor of the building itself.

Sizes and prices: 3-lb. can 45c; 12-lb. carton $1.50; 25-lb. pail $2.25; 50-lb. drum $4.15; 100-lb. drum $7.50; 300-lb. barrel $20.00.

RETAIL PRICE LIST OF LEE PRODUCTS

GERMOZONE (Pages 54-60)

4 oz. bottle	$ .40
12 oz. bottle	.75
1 quart bottle	1.50
*½ gallon jug	2.50
*1 gallon jug	4.50

GIZZARD CAPSULES (Pages 61-63)

Adult Size	Can of 50	$ .75
	Can of 100	1.25
	5 Cans of 100	5.50
	1 Envelope of 10	.15
Pullet Size	Can of 50	$ .50
	Can of 100	1.00
	5 Cans of 100	4.50
	1 Envelope of 10	.10
Chick Size	Can of 50	$ .40
	Can of 100	.75
	5 Cans of 100	3.25
	1 Envelope of 10	.10

ACIDOX (Pages 68-69)

4 oz. bottle	$ .50
12 oz. bottle	1.00
1 quart bottle	2.00
*½ gallon jug	3.50
*1 gallon jug	6.50

LEEMULSION (Pages 70, 72)

4 oz. bottle	$ .50
12 oz. bottle	1.00
1 quart bottle	2.00
*½ gallon jug	3.50
*1 gallon jug	6.50

VAPO-SPRAY (Page 71)

1 pint	$ .50
1 quart	.75
*½ gallon	1.25
*1 gallon	2.00
*5 gallon	8.75

BLITSPRAY (Page 76)

1 pint bottle	$ .75
1 quart bottle	1.25
*½ gallon jug	2.25
*1 gallon jug	4.00

LEE'S LOUSE POWDER (Page 74)

1 lb. can	$ .25
2½ lb. can	.50

TONAX (Pages 64-67)

12 oz. can	$ .30
2 lb. can	.75
6 lb. can	2.00
25 lb. pail	7.50
*50 lb. drum	14.00
*100 lb. drum	25.00

LEE'S MITE KILLER (Page 77)

1 quart	$ .60
½ gallon	.90
*1 gallon	1.50
*5 gallon	6.00

PERCH PAINT (Page 75)

½ pint can	$ .85
1 pint can	1.50
1 quart can	2.50
*½ gallon can	4.00
*1 gallon can	7.00

PICKPASTE (Page 73)

2 oz. tube	$ .25
6 oz. jar	.60

PINJECTOL (Page 73)

12 oz. bottle	$ .75
1 quart bottle	1.50
*½ gallon jug	3.00
*1 gallon jug	5.75

LEE'S DRI-RUB (Page 79)

3 lb. can	$ .45
12 lb. pail	1.50
25 lb. pail	2.25
*50 lb. drum	4.15
*100 lb. drum	7.50

HOG OIL WORMER (Page 78)

12 oz. bottle	$1.00
1 quart bottle	2.00
*½ gallon jug	3.50
*1 gallon jug	6.75

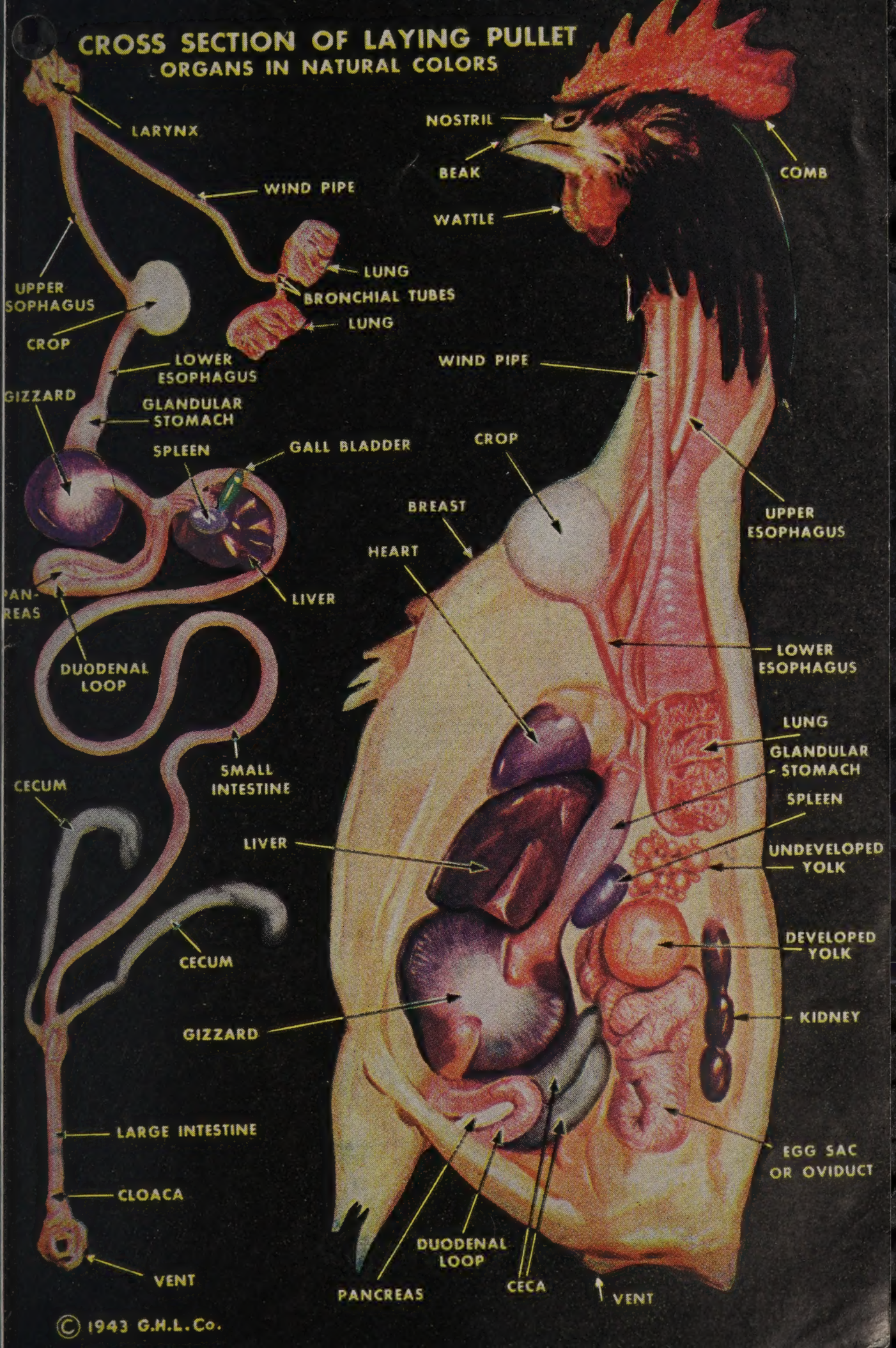
All Lee Dealers ask only our established prices. If there is no Lee Dealer at your point, you may order direct from us, cash with order. We prepay all retail shipments.

GEO. H. LEE CO., Omaha 8, Nebraska

***Cannot be mailed, but can be sent by express or freight.**

Copyright 1945 Geo. H. Lee Co. (Printed in U. S. A.) 5th Printing-100M-WPCo.

CROSS SECTION OF LAYING PULLET
ORGANS IN NATURAL COLORS

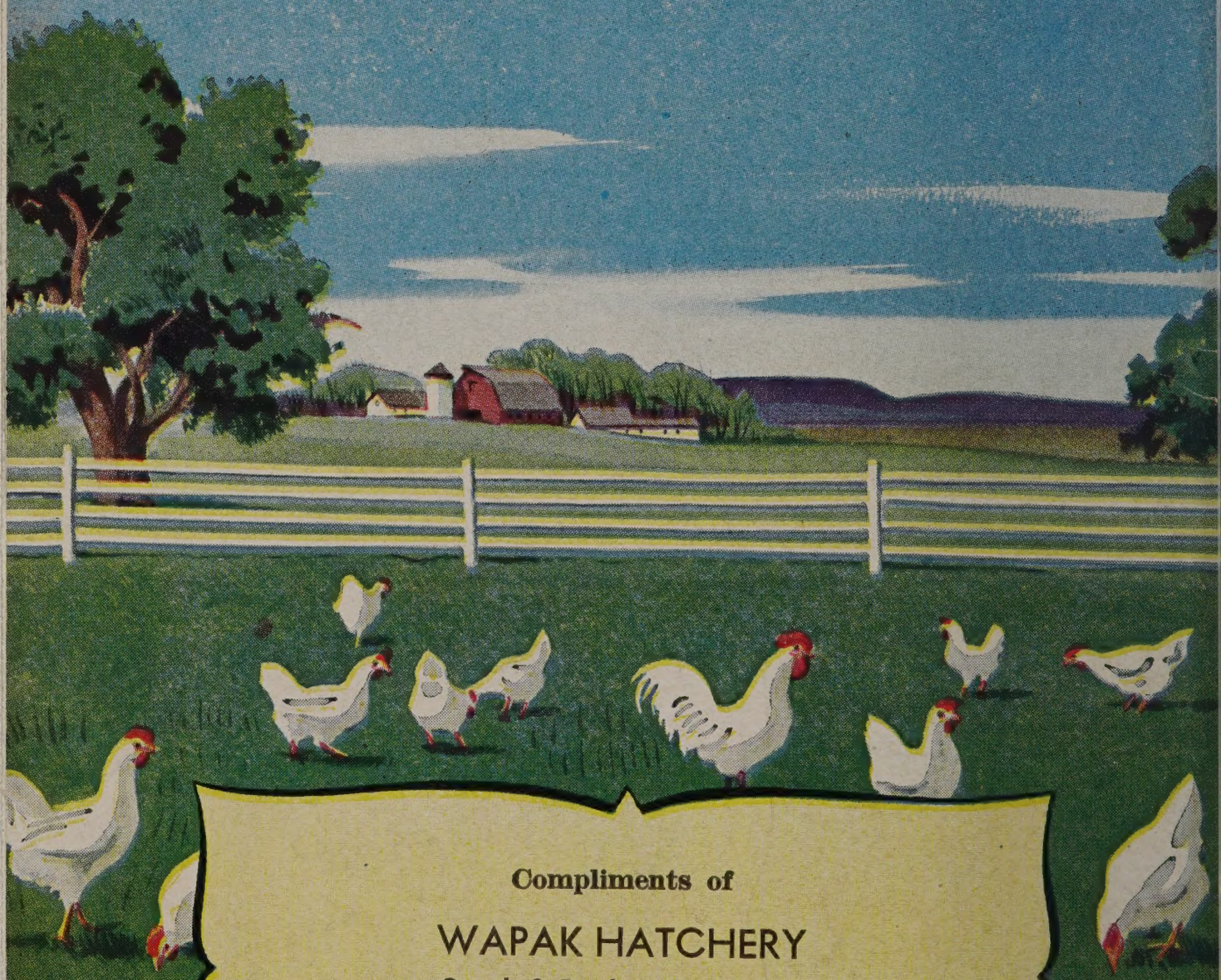


© 1943 G.H.L. Co.

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
Omaha, Nebr.
Permit No. 535

Rural Route—Local

Boxholder



Compliments of

WAPAK HATCHERY

Stock & Poultry Remedies

WAPAKONETA, OHIO

GEO. H. LEE COMPANY OMAHA 8, NEBRASKA